

# Cemented Total Hip Arthroplasty with Sub trochanteric Femoral Shortening Osteotomy, a Cost-effective Procedure to Manage Advanced Osteoarthritis of Hip Joint: A Case report and Review of Literature

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## Abstract

A 60-year-old male had a history of Avascular Necrosis (AVN) with advanced secondary osteoarthritis of both hip joints. Total Hip Arthroplasty (THA) concomitant with subtrochanteric femoral shortening osteotomy using a cemented stem was performed. The subtrochanteric osteotomy was performed with an amount of osteotomy equal to the amount of distal translation of the hip centre to the original acetabulum. The pelvic obliquity improved, and the subjective leg length discrepancy disappeared after the surgery.

**Keywords:** Cemented total hip arthroplasty; Subtrochanteric femoral shortening osteotomy; Open reduction and internal fixation.

## Introduction

Total hip arthroplasty (THA) is the defined procedure for cases like long-standing arthritic hip with deformity, neglected developmental dysplasia of the hip (DDH), dysplastic hip etc. In such Crowe type III/IV hips, uncemented stem with subtrochanteric femoral osteotomy is generally done. There have been many case series and retrospective studies published in this regard. But in our country, the cost of the treatment is an essential factor that determines whether the patient will opt for it. We report a case of THA combined with subtrochanteric femoral shortening osteotomy using a cemented stem as a cost-effective procedure in less affordable but deserving patients.

Advanced osteoarthritis of hip joint characterized by anatomical abnormalities, biomechanical alterations, femoral deformities and severe soft tissue contractures, severe DDH, long term arthritic hip increases the complexity of performing THA [1, 2]. Subtrochanteric osteotomy in THA allows for acetabular exposure and diaphyseal shortening while facilitating femoral derotation. Furthermore, proximal femoral bone stock is maintained, and some of the potential complications of greater trochanteric osteotomy may be avoided [3]. THA concomitant with subtrochanteric femoral shortening osteotomy for Crowe type IV dysplastic hip has been reported to have good postoperative outcomes as a surgical option to enable stable hip reconstruction by placing the cup into the original acetabulum [4, 5, 6]. On the other hand, postoperative leg length discrepancy is an essential factor for patient satisfaction in THA. Significant

postoperative leg length discrepancy is contributed to gait asymmetry, low back pain, adjacent articular symptom, and nerve palsy [7].

## Case Report

A 60-year-old male presented with a history of Avascular Necrosis (AVN) with secondary osteoarthritis of both hip joints. After a careful physical examination and radiological imaging, the patient was taken up for the proposed surgery. Informed written consent was obtained from the patient for publication of this case report and accompanying images.

Preoperative planning was performed with antero-posterior digital X-rays of known magnification. Three-dimensional CT scan was used to assess the severity of hip dysplasia.

A posterolateral approach in lateral decubitus position on a radiolucent table was used. After adequate exposure to the hip joint, the acetabulum was prepared. The true acetabular fossa was identified, deepened and medialised (as described by Sener et al.). The bone graft was taken from the head and the superolateral area of the acetabulum. The acetabulum was reconstructed with an uncemented cup (DePuy pinnacle). The trial and final position were checked and rechecked with an image intensifier before implantation. After the satisfactory implantation of the acetabular cup and the liner, the proximal femur was reamed with a successive increase in diameter. Sequential rasping with broaches was carried out with a cemented (Corail, DePuy) broach until an appropriate stem size was achieved. A marking with the saw blade by creating a groove along the anterolateral side of the femur was done for a length of -0 cm before the two osteotomies. The rotational alignment of the proximal and distal part of the femur can be matched later on. Then proximal transverse osteotomy was carried out just below the lesser trochanter with a reciprocating saw. The final reamer was inserted, keeping in normal anteversion. With the final broach in place, the distal femur was pulled distally to determine the extent of overlapping



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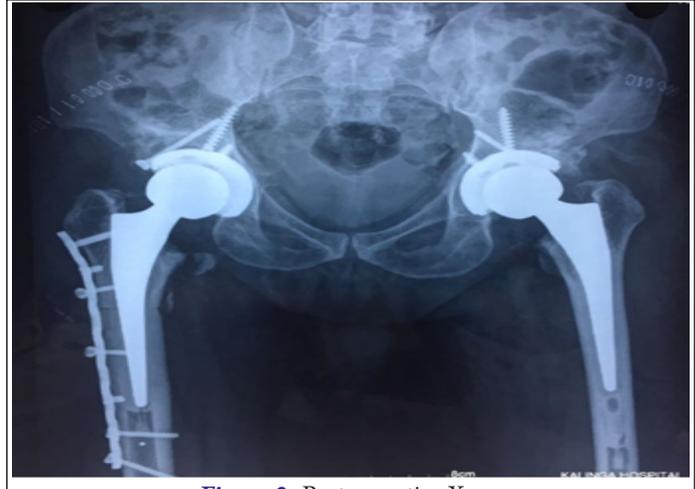
**Figure 1:** Pre operative X-ray

/shortening and the distal osteotomy line.

Open reduction and internal fixation (ORIF) with a 3.5 mm plate was carried out with 2 to 3 unicortical screws on either side after matching the rotational alignment of both the fragments. Gelfoams were kept in the osteotomy site to avoid cement penetration to the osteotomy site. A regular cemented stem fixation with the Corail stem was done in a described manner. The bone graft taken from the head was put around the osteotomy site. The hip joint was reduced and checked for ROM, stability, and the final limb length was assessed. With the image intensifier, the final position was checked, and the surgical site was closed. The post-op rehabilitation protocol was the same as with a standard THA case.

## Discussion

DDH, neglected fracture-dislocation of hip joints, and long term untreated arthritic hip with superior migration constitute a significant chunk of conditions that require a THA with subtrochanteric osteotomy. Transverse shortening osteotomy is a convenient way to determine the femur's rotation at the osteotomy site. There have been various other types of osteotomies described, such as V-shaped osteotomy, step-cut osteotomy, and chevron osteotomy. Charity et al. [4] and Kawai et al. [5] reported a procedure similar to the present case and proposed a good result using a cemented stem combined with



**Figure 2:** Post operative X-ray

transverse osteotomy for 18 hips with an average follow-up of 114 months and 42 months. Even though the procedure's cost remains constant, the distal fixation uncemented stems demand a much higher price that remains beyond the reach of most people needing this surgery. In such a scenario, a regular cemented stem and fixation (ORIF) of the osteotomy sites with either uncemented or cemented acetabular cup make the THA more affordable for this group of patients. In the present case, cemented THA was performed for the left side with adequate soft tissue balancing. But while performing THA for the right hip, the same could not be done. So, the need for a regular cemented stem and the fixation (ORIF) of the osteotomy site was done.

The present case report can be applied explicitly for patients belonging to lower socio-economic strata and with government Schemes like OSTF (Odisha State Treatment Fund) and Ayushman Bharat.

Limitations associated with this case report include the fact that the postoperative follow-up period was quite short (one and half year) and that future observation of progress is necessary. Secondly, depending on the case, pelvic obliquity may not improve postoperatively. It is necessary to consider multiple factors, such as degenerative scoliosis and hip contracture, when devising preoperative plans regarding leg length [8].

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