



## Revision of The Total Hip Arthroplasty Previously Placed False Acetabulum

### Yalancı Asetabulumuna Yerleştirilen Total Kalça Artroplastisinin Revizyonu

Mahmut KURTBOĞAN<sup>1</sup> , Cengiz IŞIK<sup>1</sup> , Cemal ALKAN<sup>1</sup> , Mahmut Timur TURHAN<sup>1</sup> 

<sup>1</sup>Bolu Abant İzzet Baysal University Medical School, Department of Orthopedics and Traumatology, Bolu, Türkiye

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#### Abstract

**Introduction:** The initial management of coxarthrosis is conservative modalities; the final treatment is total hip arthroplasty. It is essential to place the acetabular cup in the true acetabulum.

**Case report:** For a 43-year-old female patient, total hip replacement was performed, and it was seen that the acetabular cup was placed in the false acetabulum at a different medical center. Later, loosening of the prosthesis was detected, and revision total hip arthroplasty was performed about 26 months after the index surgery. The acetabular cup, previously placed in the false acetabulum, was left in place to act as a bone stock at the superior acetabulum. It was observed that there was no complication in the patient follow-up.

**Conclusion:** There is no femoral head that can be used as a graft to support the superior region of the true acetabulum in some revision cases. The acetabular cup, placed at the false acetabulum, can be used as an abutment in cases of aseptic loosening.

**Keywords:** Dysplastic Coxarthrosis, Revision Total Hip Arthroplasty, False Acetabulum, Surgery.

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#### Öz

**Giriş:** Koksartrozun ilk tedavisi konservatif yöntemler olmasına rağmen nihai tedavi total kalça protezidir.

**Olgu:** 43 yaşında kadın hastaya dış merkezde total kalça protezi ameliyatı uygulanmış ve asetabular komponentin yalancı asetabulumuna yerleştirildiği görülmüştür. Daha sonra protezin gevşediği belirlendi ve ilk ameliyatından yaklaşık 26 hafta sonra revizyon total kalça artroplastisi yapıldı. Önceden yalancı asetabulumuna yerleştirilen asetabular komponent asetabulum superiorunda kemik stoğu görevi görmesi için yerinde bırakıldı. Hastanın takiplerinde herhangi bir komplikasyon izlenmedi.

**Sonuç:** Bazı revizyon vakalarında gerçek asetabulumun superior bölgesini desteklemek amacıyla greft olarak kullanılabilen femur başı yoktu, yalancı asetabulumuna yerleştirilen asetabular komponent de aseptik gevşeme vakalarında destek olarak kullanılabilir.

**Anahtar Kelimeler:** Displastik Koksartroz, Revizyon Total Kalça Protezi, Yalancı Asetabulum, Cerrahi.

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\*Sorumlu Yazar (Corresponding Author): Mahmut Kurtboğan, e-mail: kurtbogann@gmail.com



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## Introduction

Developmental dysplasia of the hip (DDH) seen in infancy is the most common cause of secondary hip osteoarthritis in young patients (1). Although conservative treatment is the first step to managing dysplastic coxarthrosis, hip arthroplasty is the definitive treatment of pain and limitation of movement (2). Osteoarthritis patients secondary to developmental hip dysplasia (DDH) require total hip arthroplasty (THA) surgery at an earlier age than primary osteoarthritis patients. Surgery is more complex in these patients, and complication risk is higher than standard hip arthroplasties due to insufficient amount of acetabular bone, the disorder of the proximal femur anatomy, increased anteversion, muscle contractures, and limb length discrepancy (3).

In dysplastic coxarthrosis cases, the most crucial part of the surgery is acetabular reconstruction. Despite the superior placement of the acetabular component being accepted without lateral placement, it is recommended to place it in the true acetabulum as much as possible (3). Acceptable bone coverage is vital for adequate stability in placing the acetabular component in the true acetabulum (4). In Crowe type III and some types II and IV cases, the femoral head is used as an autograft for the insufficient superoposterior part of the acetabulum, or the acetabular component may need to be placed slightly above the true acetabulum (5). In cases where the acetabular component cannot be placed in the true acetabulum, the biomechanics of the hip will change significantly due to the change in the center of rotation of the hip, the durability of the reconstruction will be adversely affected, and this will cause premature loosening of the prosthesis (5).

The femoral head can be superiorly placed as a graft to support the acetabular component. The amount of the graft that covers the acetabular component should not exceed %40. (4). In this case, the previously placed acetabular component was left in place as an abutment since there was no femoral head. In the patient follow-ups, it was observed that the component placed in the false acetabulum acted as a support and remained stable.

## Case Presentation

This case report did not require approval by the ethical committee.

A 39-year-old female patient was diagnosed with DDH in infancy, and a spica cast was recommended as a treatment. The family refused the treatment and did not attend the follow-ups. In the last five years, pain in the right hip, especially at night time, and sleep disorder due to pain began to occur. The patient's resting pain started and gradually increased. As the patient's complaints did not regress and her complaints increased, the patient underwent primary total hip arthroplasty on 12.01.2015 at a different medical center. In this surgery, the patient's acetabular component was placed in the false acetabulum. The patient, who continued her active life after the surgery, did not have pain while walking, but the previous groin and hip pain continued during the resting period. In the first postoperative year, the patient started to have pain while walking and weight-bearing on the operated leg. When the patient was admitted to our hospital due to non-reducing pain, the physical examination revealed tenderness in hip movements and groin pain while walking. The patient was clinically unable to walk long distances, sometimes felt the need to use a cane, and had trouble sitting in a chair. The Harris hip score score was 51.1. On the posteroanterior (PA) pelvis radiograph, it was seen that the right hip acetabular component was placed in the false acetabulum, and there were minimal signs of osteolysis (Figure 1). Laboratory studies of the patient's blood sample resulted in C-reactive protein: 1.8 mg/L (N: 0-5), Sedimentation: 32 mm/h (N: 0-20), White blood cells: 4.4 K/uL (4.5-11.0). In the scintigraphy performed on 24.02.2017, it was reported that slightly increased activity uptake was detected in the superior portion of the acetabular component of the right hip prosthesis and trochanter major and minor, but these findings were not clear scintigraphic findings suggesting prosthesis infection/loosening. Since the patient's complaints continued and were not improved with medical treatment, revision total hip replacement surgery was performed, and the acetabular component was planned to be placed in the true acetabulum on 21.03.2017; the revision surgery was performed about 26 months after the index surgery.

On the first postoperative day, the patient was mobilized without any weight bearing. In-bed exercises and daily dressings were made. The patient was discharged on the fifth day because there were no complications in the postoperative period. On the 15th postoperative day, the sutures were removed at the outpatient follow-up. In the subsequent outpatient controls, it was observed that the patient's pain decreased, and her complaints

were improved. In the postoperative evaluation at the sixth month, the patient's pain decreased, and there was seldom pain. There was no need to use a cane; it was possible to sit in a chair. There was no limb incompatibility between both extremities preoperatively and postoperatively. There was no infective finding in place of the acetabular component, which was left in place during the intraoperative period. Acute phase reactants were normal both preoperatively and postoperatively. The walking distance had increased significantly, up to 10 times. The Harris hip score score was 85.55. The patient had no complaints in the 5th year following (Figure 2). No complications occurred.



**Figure 1.** Pelvis x-ray of postoperative 24th months after the total hip arthroplasty, osteolysis of the acetabular cup at first operation at different center



**Figure 2.** Pelvis x-ray of postoperative 5th years after the revision total hip arthroplasty

## Discussion

This case report is the first revision hip replacement surgery in the literature in which the old acetabular component is left in place.

One of the most technically challenging parts of arthroplasty in dysplastic coxarthrosis patients is to obtain a stable and long-lasting acetabular component that can be covered with sufficient bone tissue (4). Indication of total hip arthroplasty in coxarthrosis due to DDH patients is not different from that in primary coxarthrosis cases (6). In this respect, one of the situations that should be considered is where the acetabular bone support is the greatest, the true acetabulum, or the region around it (7). As we move proximally towards the iliac bone, the bone support weakens, and the risk of loosening the acetabular component increases (7). In patients with dysplasia, placing the acetabular component as medial to the true acetabulum as possible will reduce the moment arm of the body weight, thereby reducing the pressure on the acetabular component (8). In the 15-year follow-up, Linde et al. reported that the loosening rate was 13% in the acetabular components placed in the true acetabulum and 42% in those places in superiorly (3). In a study by Johnston et al., they found that the abductor muscles spend 116% more force during normal walking as a result of 20 mm proximal, 20 mm lateral, and 10 mm posterior placement of the hip center (3).

The support of the acetabular component with bone grafts was brought to the agenda by Dunn and Hess (8) and the femoral head was used as an autograft by Harris for support in cemented acetabular components. (9). In Harris' study series, although the union of the graft placed in the early period was observed, loosening rates of 20% at the end of the 7th year and 46% at the end of the 11th year were found (9). The reason for these loosening in the long term has been found to be the use of the sclerotic, cystic degenerated femoral head of the graft and the graft covering more than 40% of the acetabular component (10). Rodriguez, on the other hand, emphasized that the coverage rate of the acetabular component of the graft should be less than 40%, stated that the graft maintains its vitality and integrity, and noted that the main reason for loosening is the inadequacy of the cemented fixation rather than the collapse of the graft (10). In our case, due to the very few bone stocks between the false and true acetabulum, we did not remove the acetabular cup, previously placed in the false acetabulum, and provided superior support to the acetabular cup placed in the true acetabulum. By not using an extra autograft in this region, we prevented the resorption problem encountered in grafts. Thus, we forestalled the possibility of loosening the acetabular component due to graft resorption. Although there was no finding to suspect infection during the operation, we removed the polyethylene insert, which does not have any support function, so it does not constitute a source of infection.

Revision surgeries of patients with DDH who have undergone TKA are more challenging and have a higher risk of complications. Since there is no femoral head that can be used as a graft to support the superior region of the true acetabulum in these revision cases, the acetabular cup, placed at the false acetabulum, can be used as an abutment in cases of aseptic loosening.

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## References

1. JH B. Congenital and Developmental of Anomalies of Hip and Pelvis, İn: Canale ST (ed). Campbell's Operative Orthopaedics. Ninth ed. Missouri, Mosby-Year Book Inc,1998:1021-60.
2. Sanchez-Sotelo, J., et al., Surgical treatment of developmental dysplasia of the hip in adults: I. Nonarthroplasty options. J Am Acad Orthop Surg, 2002;10(5):321-33.

3. SHI, Xiao-tong, et al. Preoperative planning for total hip arthroplasty for neglected developmental dysplasia of the hip. *Orthopaedic Surgery*, 2019; 11.3: 348-355.
4. Haddad FS, Masri BA, Garbuz OS, Duncan CP. Primary total replacement of the dysplastic hip. *J Bone Joint Surg* 1999; 81-A:1462-82.
5. Banaszkiwicz, P. A. Total hip replacement in congenital dislocation and dysplasia of the hip. In *Classic Papers in Orthopaedics*. London: Springer London. 2013;125-28
6. Harris WH: Total hip arthroplasty in the management of the congenital hip dislocation. In Callaghan JJ, Rosenberg AG, Rubash HE (eds): *The Adult Hip*. Lippincott-Rawen, Philadelphia 1998;1651-82.
7. Bicanic, Goran, et al. Current concept in dysplastic hip arthroplasty: Techniques for acetabular and femoral reconstruction. *World journal of orthopedics*, 2014; 5.4: 412.
8. Greber, Eric M., et al. Challenges in total hip arthroplasty in the setting of developmental dysplasia of the hip. *The Journal of arthroplasty*, 2017; 32.9: S38-44.
9. Hartofilakidis, George; Karachalios, Theofilos. Total hip arthroplasty for congenital hip disease. *JBJS*, 2004;86.2: 242-50.
10. Schofer, Markus D., et al. Reconstruction of the acetabulum in THA using femoral head autografts in developmental dysplasia of the hip. *Journal of Orthopaedic Surgery and Research*, 2011; 6: 1-7.