Acetabular Liner Revision Using an Anterolateral Approach

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abstract

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Total hip arthroplasty (THA) is recognized as a successful treatment for degenerative hip joint disease. An epidemiological study using the National Hospital Discharge Survey in the United States reported that the number of primary THAs increased from 119,000 in 1990 to 193,000 in 2002. According to nationwide inpatient sample data, the demand for primary THA was estimated to increase from 208,600 in 2005 to 572,000 (174%) in 2030 in the United States. The number of revision THAs in the United States has subsequently increased and is projected to increase from 40,800 in 2005 to 96,700 in 2030. Because revision THAs have a higher incidence of dislocation than primary THAs, preserving the soft tissue, including the gluteus medius muscle, is more necessary at revision THA. However, to our knowledge, few studies have reported soft tissue damage at revision THA. An anterolateral modified Watson-Jones approach, which is between the hip abductor and the tensor fascia lata, preserves the abductor muscles.

This article describes 2 cases in which acetabular liner revision was performed through an anterolateral modified Watson-Jones approach. The anterolateral approach provided an excellent surgical field at acetabular liner revision, with no major complications, and has the possibility of being a useful for acetabular liner revision.

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Figure: Preoperative anteroposterior radiograph showing the polyethylene liner and breakage of the locking mechanism.
Total hip arthroplasty (THA) is a successful treatment for degenerative hip joint disease. Several studies have reported high clinical success rates in terms of patient satisfaction and pain relief. An epidemiological study using the National Hospital Discharge Survey in the United States reported that the number of primary THAs increased from 119,000 in 1990 to 193,000 in 2002.\(^1\) According to nationwide inpatient sample data, the demand for primary THA was estimated to grow from 208,600 in 2005 to 572,000 (174\%) by 2030 in the United States.\(^2\) The number of revision THAs in the United States has subsequently increased and is projected to grow from 40,800 in 2005 to 96,700 in 2030.\(^2\)

Using Medicare claims data, Phillips et al\(^3\) reported that the dislocation rate was 3.9\% at primary THA in the first 26 postoperative weeks and 14.4\% at revision. Because revision THAs have a higher incidence of dislocation than primary THAs, preserving the soft tissue, including the gluteus medius muscle, is more necessary at revision THA. However, to our knowledge, few studies have reported soft tissue damage at revision THA. This article describes 2 cases of acetabular liner revision performed through an anterolateral approach.

**Case Report**

**Patient 1**

A 56-year-old woman underwent THA through a direct lateral approach for steroid-associated osteonecrosis of the right femoral head in 1997. Although her postoperative course was uncomplicated, radiographs showed polyethylene liner wear in 2005. Because the polyethylene liner wear progressed (Figure 1), acetabular liner revision was performed in 2009. Bertin and Röttinger’s\(^4\) anterolateral approach was used to gain access to the hip joint. The acetabulum was well visualized, and debridement of the periacetabular soft tissues was conducted to fully visualize the entire rim of the acetabular shell and confirm shell locking mechanism damage. Subsequently, all screws were removed, and shell fixation was tested for rotational and push–pull stability. Because the acetabular shell was well fixed in the pelvis and its locking mechanism was intact, we performed an isolated polyethylene liner exchange (Figure 2). Two years later, the patient continues to function at full capacity, with no radiographic evidence of loosening.

**Patient 2**

A 77-year-old man underwent right cementless THA using a posterior approach for osteoarthritis in 1990. Polyethylene wear since 2001 and partial breakage of the locking mechanism since 2005 were recognized radiographically. In 2009, he reported hip joint discomfort with abnormal sounds, and radiographs revealed breakage of the polyethylene liner (Figure 3); therefore, revision THA was performed. An anterolateral approach was used to access the joint. Because the locking mechanism of the acetabular shell was broken but the acetabular shell was stable, we cemented a polyethylene liner into the acetabular shell using a polymethylmethacrylate polymer and grafted allograft bone for osteolysis (Figure 4). Two years later, the patient continues to have slight dullness of the right hip, but radiographs revealed no evidence of loosenning.

**Discussion**

The direct lateral approach was introduced by Hardinge\(^5\) in 1982. A direct lateral approach provides an excellent surgical field in THA, and some authors reported good results with no major complications.\(^6,7\) However, complications associated with abductor weakness due to superior gluteal nerve injuries have been reported.\(^8-11\)
To preserve hip abductor function, an anterolateral modified Watson-Jones approach was reported by Bertin and Röttinger. This approach, which is between the hip abductor and the tensor fascia lata, preserves the abductor muscles. Müller et al reported results from a randomized controlled trial to evaluate abductor muscle damage by comparing an anterolateral approach with the direct lateral approach in primary THA. No significant difference existed between the 2 groups in abduction strength and Harris Hip Scores, but Trendelenburg’s sign was significantly more frequent after the direct lateral approach than the anterolateral approach 12 months postoperatively. After magnetic resonance imaging, Müller et al reported that fatty atrophy in the anterior part of the gluteus medius muscle was more evident after the direct lateral approach than the anterolateral approach. These findings demonstrated that an anterolateral approach preserves soft tissues, including the gluteus medius muscle. Because the incidence rates of dislocation were highest during the immediate postoperative period in revision THA, soft tissue preservation is important. However, to our knowledge, few studies have reported soft tissue damage during the different surgical approaches at revision THA.

An anterolateral approach provides a more inferior surgical field than a direct lateral approach, although it is more superior in preserving the soft tissue than a direct lateral approach. Bernasek et al retrospectively compared the anterolateral approach with the direct lateral approach in primary THA and reported that the prevalence of varus stem alignment >5° in the anterolateral approach group was significantly higher than that in the direct lateral approach group. Because no significant difference existed in cup abduction angles between the 2 groups, no problems occurred in accessing the acetabular shell at acetabular liner revision through an anterolateral approach. To our knowledge, few cases have reported acetabular liner revision using an anterolateral approach, and our experience indicated that no problem occurred using an anterolateral approach for acetabular liner revision.

In 1998, LaPorte et al reported 2 cases of acetabular liner revision in a nonmodular, metal-backed component, using cement to secure the polyethylene liner. Subsequently, a follow-up study >2 years later and biomechanical analysis revealed its effectiveness. Removal of a well-fixed component is performed at a higher risk of bone stock compromise with each revision and may result in a higher incidence of subsequent component loosening. Therefore, we performed this procedure for patient 2 because the cup was well fixed but the locking mechanism was broken.

A randomized, controlled trial or long-term follow-up study is needed to evaluate its effectiveness because this case report is limited to our experience with 2 patients.

**CONCLUSION**

The anterolateral approach provided an excellent surgical field at acetabular liner revision with no major complications and can be a useful approach for acetabular liner revision.

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