

Labral Preservation: Outcomes Following Labrum Augmentation Versus Labrum Reconstruction



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Purpose: The purpose of this study was to compare the clinical outcomes and patient satisfaction between patients with previous surgeries who underwent hip labral augmentation versus labral reconstruction surgery. **Methods:** From 2006 to 2014, all patients with previous labral procedures who underwent subsequent labral augmentation by the senior surgeon were included. Patients with joint space ≤ 2 mm and lateral center edge angle $< 20^\circ$ and who refused to participate in follow-up were excluded. Patients who underwent labral augmentation, preserving macroscopically healthy native labral tissue and adding iliotibial band graft to increase labral volume, were compared with a matching group (1:2) of patients who underwent labral reconstruction where damaged or absent native labral tissue was replaced by the graft. Hip Outcome Score-Activity of Daily Living (HOS-ADL) was the primary outcome measure. Secondary outcomes included the modified Harris Hip Score (mHHS), HOS for Sports (HOS-Sport), Short Form-12, Western Ontario and McMaster Universities Osteoarthritis Index, and patient satisfaction with outcome. Nonparametric statistics were used to compare groups. **Results:** Thirty-three patients (12 males, 21 females) who underwent labral augmentation (LA group) were compared with 66 (24 males, 42 females) labral reconstruction patients (LR group). The average age was 29 ± 10 years in both groups. Six patients (18%) required revision arthroscopy in the LA group, and 9 patients (14%) in the LR group ($P = .563$). One patient (3%) in the LA group required a total hip arthroplasty, and 3 patients in the LR group (4.5%) had a total hip arthroplasty ($P = .99$). Of the remaining 26 patients in the LA group and 53 patients in the LR group, minimum 2-year follow-up was available for 21 (81%) and 51 (96%), respectively. Postoperatively the HOS-ADL, HOS-Sport, mHHS, and Western Ontario and McMaster Universities Osteoarthritis Index were significantly higher in the LA group ($P < .05$). The percentage of patients who reached minimum clinically important difference was significantly higher in the LA group for HOS-ADL ($P = .002$) and HOS-Sport ($P = .008$); however, there was no difference for the mHHS ($P = .795$). Patient satisfaction was 10 and 8 in the LA group and LR group, respectively ($P = .585$). **Conclusions:** In patients with previous procedures, the labral augmentation technique with preservation of macroscopically healthy native labral fibers resulted in significantly better outcomes compared with the segmental labral reconstruction procedure where damaged or previously removed labrum was replaced by a graft. **Level of Evidence:** Level III, comparative case series.

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Arthroscopic hip labral preservation techniques have advanced during the last decade. The labral debridement procedure, which was the gold standard treatment for labral pathology in the past, results in inferior clinical outcomes compared with labral repair.¹⁻³ Preservation of the native labral fibers and

refixation to the acetabular bone is currently the treatment of choice in patients with uncomplicated labral tears.² When complex or irreparable labral tears are present and the native labrum cannot restore the seal mechanism, labral augmentation, where any macroscopically normal native labral fibers are

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preserved and augmented with a graft, or labral reconstruction, where native tissue is removed and replaced by a graft, techniques can be used.⁴ Regardless of the procedure performed, the ultimate therapeutic goal is to restore the labral seal mechanism, which is critical for proper biomechanical function of the hip.^{4,5}

The seal mechanism has been reported to be particularly important for reducing both hip joint contact pressures and cartilage load *in vitro*.^{6,7} This mechanism is responsible for the negative intra-articular pressurization and generation of the vacuum effect in response to hip distraction forces, which provide joint stability.⁸ In addition, loss of pressurization effect results in altered synovial fluid dynamics. This can negatively affect the nourishment and long-term maintenance of chondral surfaces and lead to early osteoarthritic changes in the hip.⁹ Other functions of the acetabular labrum include deepening of the acetabulum and femoral head coverage and load absorption particularly in patients with hip dysplasia or other structural abnormalities.¹⁰ Although not well studied, the labrum has been shown to absorb only 1% to 2% of the load transferred across a hip joint that is structurally intact.^{10,11}

Labral repair¹² is mainly indicated in cases of labral tears where the remaining labral fibers are of good quality and adequate tissue substance exists to restore the hip labral seal. Ideally, the labral fibers should engage the proximal part of the femoral head without leaving a "gap" between the labrum and the femoral bone. This can be assessed intraoperatively by performing hip dynamic examination under direct joint visualization using the arthroscope.¹³ The labral augmentation procedure⁵ is indicated when the remaining labral tissue is inadequate to restore the labrum but preservable circumferential fibers are still present. In this case, the labrum can be augmented using a graft without resection of the remaining preservable fibers. The labral reconstruction procedure¹⁴ is reserved for patients with irreparable labral tears and inadequate remaining tissue that is also of poor quality and thus should be excised. Various graft types, both auto- and allografts, have been used to perform labral augmentation^{5,15} or reconstruction.¹⁴⁻¹⁹ No difference in the tensile properties of different grafts have been reported²⁰; however, an allograft may cause adverse events and increased cost.²¹

The clinical outcomes following hip preservation procedures have been reported as successful,^{1,14,20,22-24} although there are few reports with longer than 5 years of follow-up time.^{25,26} The purpose of this study was to compare the clinical outcomes and patient satisfaction rate between patients with previous surgeries who underwent hip labral augmentation versus labral reconstruction surgery.

Methods

Study Design

This study was approved by the Vail Valley Medical Center institutional review board. From 2006 to 2014, patients were included in this study if they were 15 years of age or older and underwent hip labral augmentation procedure using iliotibial band (ITB) autograft by the senior author (M.J.P.; LA group). Patients were matched 1:2 with patients undergoing labral reconstruction, based on age (± 1 year) and gender. Patients were excluded if they had 2 mm or less of joint space or less than 2-year follow-up or refused to participate in follow-up. A power analysis was performed using G-Power 3.1.9.2 (Universität Kiel, Germany). We assumed a 10-point difference in the Hip Outcome Score-Activity of Daily Living (HOS-ADL), with a standard deviation of 15 and an allocation ratio of 2:1. For 80% power, a minimum of 21 patients were needed for the LA group.

Revision arthroscopies or total hip arthroplasties (THAs) were recorded as end points. The outcomes scores were collected preoperatively and at a minimum 2 years after surgery for the augmentation and reconstruction group members who did not require revision or THA. The HOS-ADL was the primary outcome measure. The HOS Sports scale (HOS-Sport), modified Harris Hip Score (mHHS), 12-Item Short Form Health Survey Physical Component Summary, Western Ontario and McMaster Universities Osteoarthritis Index, Vail Hip Score, and patient satisfaction rate (1-10, with 10 being very satisfied) were the secondary outcome measures. Minimum clinically important difference and patient acceptable symptom state were calculated based on prior studies.²⁷ Additional parameters collected for both groups included demographic information and preoperative radiographic Tonnis grade, hip joint space, lateral center edge angle, and alpha angle.

Preoperative Patient Evaluation

Patient history was obtained with emphasis on prior hip procedures. Physical examination included palpation of the bony prominences of the hip joint and pelvis, femoroacetabular impingement tests, and flexion abduction external rotation distance test. The anteroposterior pelvis x-ray view was used for the assessment of the pincer lesion and for joint space measurement. The 45° Dunn radiographic view was used for cam evaluation and measurement of the alpha angle. All patients underwent nonarthrogram 3T magnetic resonance imaging examination to assess the soft tissues (labrum, capsule, muscles) and exclude coexisting pathology such as avascular necrosis of the

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