

# Patient Satisfaction after Arthroscopic Repair of Acetabular Labral Tears

Yong-Chan Ha, MD, Ki-Choul Kim, MD\*, Yong-Eun Shin, MD\*

Department of Orthopaedic Surgery, Chung-Ang University College of Medicine, Seoul,

\*Department of Orthopedic Surgery, Dankook University Hospital, Dankook University Medical College, Cheonan, Korea

**Background:** Acetabular labral tear is a main cause of hip pain and disability, often requiring surgical treatment. Improvements of hip arthroscopic technique have produced positive outcomes after labral repair with arthroscopy. The purpose of this study was to determine clinical outcomes and patient satisfaction after arthroscopic repair of acetabular labral tear.

**Methods:** We interviewed 21 patients (10 men and 11 women; mean age, 36 years [range, 22 to 57 years]) with acetabular labral tears that had been repaired arthroscopically in terms of satisfaction of the procedure. In addition, clinical outcome was assessed using visual analog scale (VAS) score, University of California, Los Angeles (UCLA) activity, Western Ontario and McMaster Universities (WOMAC) osteoarthritis index, and Harris hip score, and radiologic outcome was assessed using serial radiography. The patients were followed for 24–50 months.

**Results:** The mean Harris hip score was 73 points (range, 64 to 84 points) preoperatively and 83 points (range, 66 to 95 points) postoperatively. Fifteen hips (71%) were rated excellent and good. The mean WOMAC osteoarthritis index and VAS scores were improved at final follow-up. UCLA activity at the latest follow-up improved in 16 patients. The Tonnis grade of osteoarthritis at the latest follow-up did not change in all patients. Eighteen of the patients (86%) were satisfied with the procedure.

**Conclusions:** High rate of satisfaction after arthroscopic repair of acetabular labral tears is an encouraging outcome. Arthroscopic treatment of labral tears might be a useful technique in patients with hip pathologies, such as femoroacetabular impingement with labral tears.

**Keywords:** *Acetabular labral tear, Arthroscopy, Labral repair*

The acetabular labrum acts as a seal to contain synovial fluid in the joint to ensure even fluid-film lubrication and nutrition of the articular cartilage.<sup>1)</sup> The intact labrum increases the surface area of the acetabulum labrum and provides a seal that helps to maintain the synovial fluid pressure.<sup>1)</sup> This contributes to joint stability, lubrication, and cartilage protection.<sup>1,2)</sup> Labral tears result from acute trauma, degeneration, overload injury due to dysplasia,

and impingement.<sup>3,4)</sup> Labral tear may lead to premature degeneration of the articular cartilage, resulting in pain and disability that often requires surgical intervention.<sup>5)</sup>

With advances in arthroscopic technique and instruments, most recent research has focused on labral repair or refixation, which yields superior results compared to debridement.<sup>6)</sup> Despite an improved understanding of labral pathology and advances in surgical techniques, studies of outcomes after acetabular labral repair have been limited in Western countries and have not been reported in Asian countries.<sup>6-9)</sup> The life style of Asian populations involves sitting on the floor with legs crossed or kneeling, resulting in further flexion and abduction in daily activities as compared to Western culture.

The purpose of this study was to determine the clinical outcomes in Asian patients who had arthroscopic

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Correspondence to: Ki-Choul Kim, MD

Department of Orthopedic Surgery, Dankook University Hospital, Dankook University Medical College, 201 Manghyang-ro, Dongnam-gu, Cheonan 330-715, Korea

Tel: +82-41-550-6290, Fax: +82-41-550-6319

E-mail: puhoo73@hanmail.net

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labral repair and to evaluate satisfaction rate at a minimum of 2 years after index arthroscopic surgery.

## METHODS

Between September 2007 and August 2010, we performed

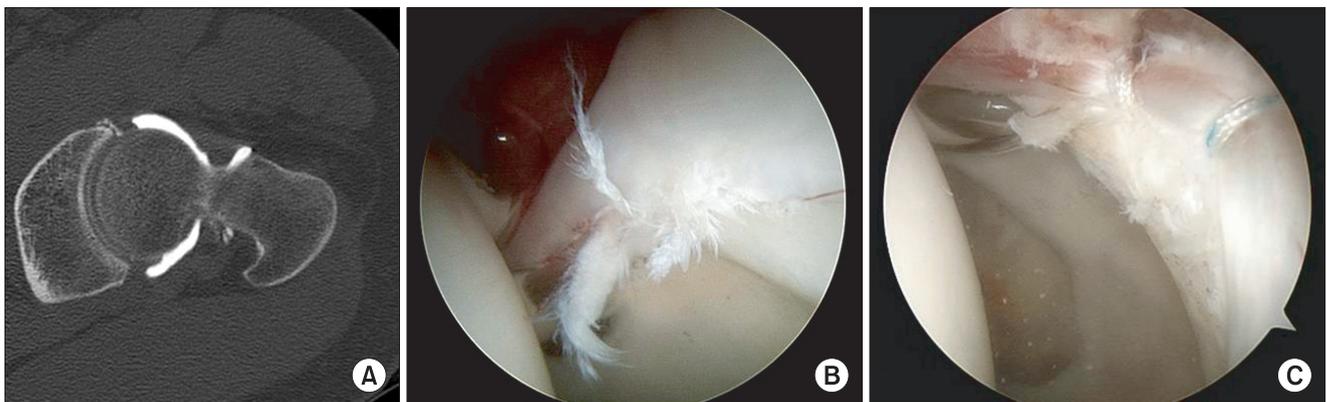
**Table 1.** Patient Demographic Data

Characteristic	No. (%)
No. of patients	21
Gender (male : female)	10 (47.6) : 11 (52.4)
Age (yr), mean (range)	35 (22–57)
Body mass index (kg/m <sup>2</sup> ), mean (range)	22 (17–28)
Diagnosis	
Isolated labral tear	11 (52.4)
Cam type impingement	6 (28.6)
Pincer type impingement	4 (19.0)
Tonnis grade	
0	14 (66.7)
1	6 (28.6)
2	1 (4.7)
Outerbridge grade	
0	13 (62.0)
1	1 (4.7)
2	3 (14.3)
3	4 (19.0)

arthroscopic surgery in 207 patients. Of them, 21 patients that underwent arthroscopic labral repair were included in this study. They were followed-up for a minimum of 2 years postoperatively. The indications for surgery were hip pain with associated mechanical symptoms and intractable pain after conservative treatment for at least 12 weeks. On physical examination, all had a painful range of motion with positive impingement test (flexion, adduction, and internal rotation). Preoperative imaging included plain radiographs (pelvis anteroposterior and frog leg) and computed tomography (CT) arthrogram to detect bony impingement and labral tear. We excluded those who had undergone previous hip surgery and those with avascular necrosis, rheumatologic disorder and patients with arthritis on radiography (Tonnis grade > 2).

There were 10 men and 11 women with a mean age of 35 years (range, 22 to 57 years). The minimum follow-up was 2 years. Preoperative diagnoses included isolated labral tear in 11 hips, cam-type impingement in six hips, and pincer-type impingement in four hips. Preoperative radiographs revealed Tonnis grade 0 to 1 changes in 20 hips and grade 2 changes in one hip (Table 1).

We performed hip arthroscopy using a standard fracture table with patient in the supine position. Traction was applied with slight extension and adduction of the hip joint with enough force to open the joint approximately 1 cm. Two or three portals (anterolateral, anterior, and/or posterolateral) were placed for arthroscopic labral repair. A suture anchor was placed on the capsular side and secured, followed by a suture passer was used to deliver a limb suture through a small portion of the substance of the labrum. An arthroscopic sliding knot was tied and passed down the cannular to secure the repair. The operation was completed by joint lavage and injection with local anes-



**Fig. 1.** A case of a 24-year-old man with hip pain mechanical symptoms. (A) Computed tomography arthrography shows an anterosuperior labral tear (1 o'clock to 2 o'clock position). (B) Arthroscopic finding shows a peripheral longitudinal labral tear. (C) Arthroscopic view shows labral repair with two suture anchors.

thetic. All operations were performed by one surgeon (Fig. 1).

Postoperatively, all patients followed a standardized rehabilitation program. Immediately after surgery, passive and active range of movement was permitted. Patients were kept toe-touch weight bearing for 2 weeks with range of motion encouraged but avoiding extremes of external rotation. In general, patients typically required 2 to 3 weeks of crutch assistance. Patients who underwent microfracture were kept toe-touch weight bearing for 6 to 8 weeks. Clinical and radiographic follow-up evaluations were performed at the 6 weeks, 3 months, 6 months, 12 months, and every 6 months thereafter. Patients that did not attend regularly scheduled visits were contacted by telephone.

Patient satisfaction was evaluated by interview at the last follow-up. Clinical evaluations were performed using Harris hip score (HHS),<sup>10</sup> visual analog scale (VAS), Western Ontario and McMaster Universities (WOMAC) osteoarthritis index, University of California, Los Angeles (UCLA) activity, and a satisfaction survey. Radiographic analyses included anteroposterior view of pelvis, frog-leg lateral view, and translateral view of hip. All radiographs were assessed using the Tonnis classification,<sup>11</sup> which was used to grade radiographic degenerative changes, and the Outerbridge classification system,<sup>12</sup> which grades the degree of chondromalacia.

The difference between preoperative and postoperative outcome measures were analyzed using Wilcoxon signed rank test for continuous outcome measures and Fisher exact test for categorical outcome measures. We rejected null hypotheses of no difference if  $p$ -values were  $< 0.05$ . For statistical analyses we used SPSS ver. 15.0 (SPSS Inc., Chicago, IL, USA).

The study was approved by our Institutional Review Board for biomedical research.

## RESULTS

### Patient Satisfaction

Eighteen patients reported that they were satisfied with the reduction or elimination of preoperative pain. Although the clinical scores improved compared to preoperative scores, three patients were not satisfied with the results of the surgery. In these patients, the VAS score was reduced by 2 points, WOMAC score was reduced by 10 points, HHS score was increased by 3 points, and the UCLA score was not changed.

### Clinical Outcome

The overall rating for the 21 patients (21 hips), using the HHS was 73 points (range, 64 to 84 points) preoperatively and 83 points (range, 66 to 95 points) postoperatively ( $p < 0.001$ ). Four hips (19%) had an excellent score, 11 hips (52%) a good score, five hips (24%) a fair score, and one hip (5%) had a poor score ( $p < 0.001$ ). The WOMAC score was 16 points (range, 2 to 50 points) at the final follow-up evaluation. UCLA activity at the latest follow-up improved in 16 patients and remained the same in two patients. The mean VAS score decreased from 8 to 2 at the latest follow-up (Table 2).

### Radiologic Outcome

At the time of surgery, arthroscopy showed synovitis in 14 hips. Synovitis was mild and focal in 10 hips and severe in four hips. Focal synovitis was associated with, and adjacent to, the chondrolabral pathology. Four of these patients had an Outerbridge grade III articular cartilage lesion of the acetabulum at the time of surgical exploration. The Tonnis grade of osteoarthritis did not change in all patients at the latest follow-up. Significant complications, such as infection, heterotopic ossification, thromboembolic episodes or permanent nerve injury, did not occur at the latest follow-up.

**Table 2.** Comparison of Clinical Outcomes

	Preoperative	Last follow-up	$p$ -value
Harris hip score	73 (64–84)	83 (66–95)	$< 0.001$
Western Ontario and McMaster Universities osteoarthritis index	36 (9–57)	16 (2–50)	$< 0.001$
University of California, Los Angeles activity	4 (2–7)	6 (2–10)	$< 0.001$
Visual analog pain score	8 (5–10)	2 (1–8)	$< 0.001$

Values are presented as score (range).

## DISCUSSION

Improved instrumentation and arthroscopic surgical technique have extended indications for hip arthroscopy. Although most studies reported encouraging short to mid-term results of arthroscopic treatment of labral tear, all of these studies were conducted in western countries (Table 3). To our knowledge, this is the first study regarding acetabular labral repair in an Asian country. Eighteen of 21 patients were satisfied with relief of pain and/or improvement of their functional outcome with no progression of arthritic change of radiographic evaluation at the minimal 2 year follow-up.

Bedi et al.<sup>7)</sup> performed a systemic review to assess outcomes after surgical treatment of labral tears and femoroacetabular impingement (FAI). They reported 65% to 85% of patients who underwent open surgical procedures were satisfied with the outcome at a mean of 40 months after surgery as compared to 67% to 100% of patients who underwent arthroscopic surgery who were satisfied. They concluded that there was no difference between open surgery and arthroscopic procedure. Therefore, arthroscopic surgery in hip pathologic conditions could substituted for open surgery. However, most of the published research has addressed debridement of torn acetabular labrum. With increasing knowledge about the function and importance of the labrum, surgical techniques including suture anchor repair must be encouraged to maintain the function of the hip joint and decrease the development of early arthritic change. Larson et al.<sup>6)</sup> compared the outcomes of arthroscopic labral debridement (44 patients) versus refixation (50 patients) in 94 patients at a mean follow-up of 3.5 years. They concluded that labral refixation resulted in better outcomes and a greater percentage of good to excellent results compared with the results of labral debride-

ment. Schilders et al.<sup>8)</sup> compared arthroscopic labral repair (69 hips) and resection (32 hips) in 96 patients (101 hips) at a mean follow-up of 2.4 years. They also concluded that labral repair provides a superior result to labral resection. Although we could not compare debridement with repair in our series, our findings are consistent with previous studies. In this study, the HHS improved from 73 points (range, 64 to 84 points) preoperatively to 83 points (range, 66 to 95 points) postoperatively, and the UCLA activity improved in 16 patients and remained similar in two patients at the latest follow-up. Eighty-six percent (18/21) of patients were satisfied with their arthroscopic labral repair.

Beaule et al.<sup>5)</sup> reviewed acetabular labral tear and mentioned that acetabular labral tears rarely occur in the absence of a structural osseous abnormality, such as FAI. FAI is a proposed etiology of early osteoarthritis in young patients.<sup>13-15)</sup> However, the incidence of hip osteoarthritis in the general population has marked ethnic and racial differences.<sup>16)</sup> The rate of moderate to severe idiopathic and secondary hip osteoarthritis in Caucasians is 3%–6% compared with ≤ 1% in East Indians, Blacks, Hong Kong Chinese, and Native Americans.<sup>17-19)</sup> Epidemiologic data suggest that the incidence of FAI and acetabular labral tear in Asian countries might be lower than in Western countries.<sup>16-19)</sup> However, if the patients have acetabular labral tear with osseous abnormality, daily activities are more seriously inconvenienced in Asian patients, as the Asian life style and culture requires more flexion and abduction motion of the hip joints. Seventy one percent (15/21 patients) in this study reported excellent and good results at the minimum 2-year follow-up. This finding is comparable with studies in Western countries. Ilizaliturri et al.<sup>20)</sup> performed arthroscopic surgery on 19 hips who were diagnosed with FAI with labral tear and reported 84% good to excellent results at the minimum follow-up of 24

**Table 3.** Summary of Outcomes of Arthroscopic Labral Repairs

Study	No. of hips	Mean age (yr)	Mean duration of follow-up (mo)	Procedure	Outcomes (MHHS)
Ilizaliturri et al. <sup>20)</sup> (2008)	19	34	24	Arthroscopy, labral repair, labral debridement	84% Good to excellent results
Larson and Giveans <sup>21)</sup> (2009)	39	27	16.5	Arthroscopy, labral refixation	89.7% Good to excellent results
Larson et al. <sup>6)</sup> (2012)	50	28	42	Arthroscopy, labral refixation	92% Good to excellent results
Schilders et al. <sup>8)</sup> (2011)	69	37	28.8	Arthroscopy, labral repair	Mean MHHS increased from 60.23 to 93.59
Haviv and O'Donnell <sup>9)</sup> (2011)	81	44	36	Arthroscopy, labral repair	57% Good to excellent results
Current study	21	35	24	Arthroscopy, labral repair	71% Good to excellent results

MHHS: modified Harris hip score.

months. Larson and Giveans<sup>21)</sup> compared the outcomes of arthroscopic labral debridement (36 hips) with those of labral refixation (39 hips). They reported 89.7% good and excellent results in refixation groups at the minimum follow-up of 12 months.

This study has several limitations. Firstly, there was no control group and the total numbers of patients were small. Nevertheless, this study proves the value for arthroscopic procedures on acetabular labral tear with or without osseous abnormality. Secondly, acetabular labral tear is frequently associated with other osseous structural abnormalities, such as cam and/or pincer-type deformities. Therefore, it is difficult to evaluate isolated the effects of arthroscopic labral repair. It is an inevitable limitation of

this study. Finally, preoperative patient expectations were not evaluated. However, we evaluated and did confirm the 86% satisfaction rate at minimum 2-year follow-up.

In conclusions, arthroscopic labral repair resulted in 86% satisfaction and 71% good to excellent results at a 2-year follow-up. Therefore, the hip arthroscopic procedure might be an excellent alternative to open surgery and promises greater probability of good to excellent results.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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