Hip Arthroscopy for Acetabular Labral Tears

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Summary: The purpose of this study is to better understand the history, physical examination, imaging, and outcome of arthroscopic debridement of acetabular labral tears. We performed a review of all 290 patients who underwent hip arthroscopy at our institution to identify those who have undergone arthroscopic debridement of an acetabular labral tear. Patients were assessed at follow-up by a physician visit or telephone interview and questioned as to pain, mechanical symptoms, activity level, work status, sports ability, and performance of activities of daily living. Patients were followed-up for a minimum of 1 year or until they underwent total hip arthroplasty (THA). All 28 patients meeting the study criteria were available for follow-up (mean age, 41 years; range, 14 to 70 years) at an average of 34 months after surgery (range, 13 to 100 months). Average duration of symptoms before arthroscopy was 25 months. Eighteen (64%) patients were noted to have mechanical symptoms such as clicking or locking. Ten patients were noted to have a specific inciting event that initiated their symptoms. Magnetic resonance imaging identified the labral tear in 5 of 21 (24%) cases; arthrography identified the tear in 1 of 8 (13%). Of the 28 tears identified, there were 12 radial flap, 5 degenerative, 5 bucket handle, 3 horizontal cleavage, and 3 peripheral longitudinal tears. Seventeen were located anteriorly, 7 were located posteriorly, and 4 were located superiorly. Patients were stratified into two groups based on the presence of significant joint arthritis on radiographs. Of those without arthritis, 10 of 14 (71%) had good to excellent results, and 2 patients underwent total hip arthroplasty at an average of 52 months after surgery. Of those with arthritis, 3 of 14 (21 %) had good to excellent results, and 6 patients underwent THA at an average of 14 months after surgery. There were three cases of complications consisting of nerve palsies (two sciatic, one pudendal) that resolved completely without any remaining functional or sensory deficits. Key Words: Labrum-Acetabulum-Hip-Arthroscopy-Labral tear.

The diagnosis of acetabular labral tear as a cause for hip pain is relatively new in the field of orthopaedics.(1) Unfortunately, this diagnosis is easily overlooked, physical findings are often nebulous, and imaging studies are usually nonspecific. In the past, the treatment of this entity has been with open excision, first of the entire labrum, then of just the torn portion of the labrum.[2,3] Recently, arthroscopy has been shown to be of benefit in the diagnosis and treatment of these tears.[4]

The authors have been performing arthroscopic debridement of the torn acetabular labrum since 1987. Each patient who has undergone hip arthroscopy at our institution has been followed-up in an attempt to better understand the new diagnoses and treatments available with this technique. The purpose of this study is to better understand the clinical presentation, diagnosis, and outcome of arthroscopic debridement of acetabular labral tears.

MATERIALS AND METHODS

All 290 patients who have undergone hip arthroscopy at our institution have been prospectively fol-

lowed-up since their index surgery. Those patients who were found to have a labral tear at arthroscopy and had their surgery at least 1 year ago were selected for inclusion in this study. Patients with arthritis and hip dysplasia were included, but those patients who also had other diagnoses of nonlabral pathology, such as snapping iliopsoas tendon or nonlabral intra-articular loose body, were excluded.

Physical examination findings were carefully documented for all patients. Plain radiographs were obtained of all patients, and additional studies were ordered as deemed necessary by the treating physician. All patients underwent extensive conservative measures before arthroscopy, including nonsteroidal anti-inflammatory medications, physical therapy, and partial weight bearing with crutches. Hip arthroscopy was performed in the lateral position as previously described.s Surgery was performed on a same-day basis whenever possible. After surgery, patients were given crutches and asked to partially weight bear on the operated extremity with advancement to full weight bearing as tolerated.

Follow-up at 1 year or more was performed by telephone or an office visit. Patients were questioned as to pain, mechanical symptoms, general activity level, ability to perform activities of daily living, work ability, and participation in sports. Specifically, they were asked to compare their current symptoms for each of these items with their preoperative symptoms on a scale of 1 to 5: 1 being much worse than before surgery, 3 being the same, and 5 being much better. Patients were then classified as having either a good or poor result by the following rule: if a patient reported 4 or 5 for every one of the above categories, then he/she was classified as having a good result, otherwise, the patient was classified as having a poor result. Any patient noted to have undergone total hip arthroplasty was classified as having a poor result. Statistics were performed using a X-square analysis; P $x.05$ or less was considered statistically significant. Continuous variables, such as age, were stratified based on histogram analysis of the data.

RESULTS

Twenty-eight patients were found to meet the inclusion criteria for this study. All 28 patients were available for follow-up at a mean of 34 months (range, 13 to 100 months). There were 15 men and 13 women, with a mean age of 41 years (range, 14 to 70 years). All patients had unilateral surgery, with 17 left and 11 right

hips undergoing arthroscopy. Eight patients (29%) were covered under Workmans' Compensation.

Ten of the 28 patients (36%) recalled a specific injury to their hip before presentation of symptoms. Eighteen patients (64%) noted mechanical symptoms: 16 (57%) symptoms of clicking, 5 (18%) of locking, and 4 (14%) of giving way. Physical examination often revealed provocative positions where pain was elicited, but these were entirely patient-dependent and ranged the whole gamut from flexion/internal rotation to extension/external rotation and no consistent patterns were noted. Plain film radiographs showed arthritis or dysplasia in 14 patients (50%). Magnetic resonance imaging identified a labral tear in 5 of 21 patients (24%) and arthrography identified the labral tear in 1 of 8 patients (13%).

The average duration of symptoms before arthroscopy was 25 months (range, 3 to 96 months). Of the 28 tears identified, there were 12 radial flap tears (43%), 5 degenerative tears (18%), 5 bucket-handle tears (18%), 3 peripheral longitudinal tears (11%), and 3 horizontal cleavage tears (11%) (Fig 1). Seventeen tears (61%) were located anteriorly, 4 tears (14%) were located superiorly, and 7 tears (25%) were located posteriorly. This distribution was a statistically significant (P = .007) deviation than what would be expected by pure chance. Provocative position on physical examination (e.g., external rotation v internal rotation) did not correlate with the location of the labral tear.

By the study criteria, there were 13 good results and 15 poor results. A correlation was found between outcome and presence of arthritis on radiography (P = .008), arthroscopically determined presence of femoral chondromalacia (P = .0004), and acetabular chondromalacia (P = .003) (Fig 2). There was no statistical correlation (P > .05) between outcome and Workmans' Compensation, presence of mechanical symptoms, tear type or location, dysplasia, duration of symptoms before arthroscopy, the presence of an initial inciting traumatic event, sex, or age. Of those patients without arthritis shown on radiographs, 10 of fi4 (71%) had a good result, and 2 patients were underwent THA. One patient continued to have severe pain and underwent THA 7 months after arthroscopy by another surgeon. The second patient developed bilateral hip degenerative arthritis and underwent arthroplasty 96 months after surgery. Of those patients with arthritis shown on radiographs, 3 of 14 (21%) had a good result, and 6 patients were noted to undergo total hip arthroplasty at an average of 14 months after surgery.
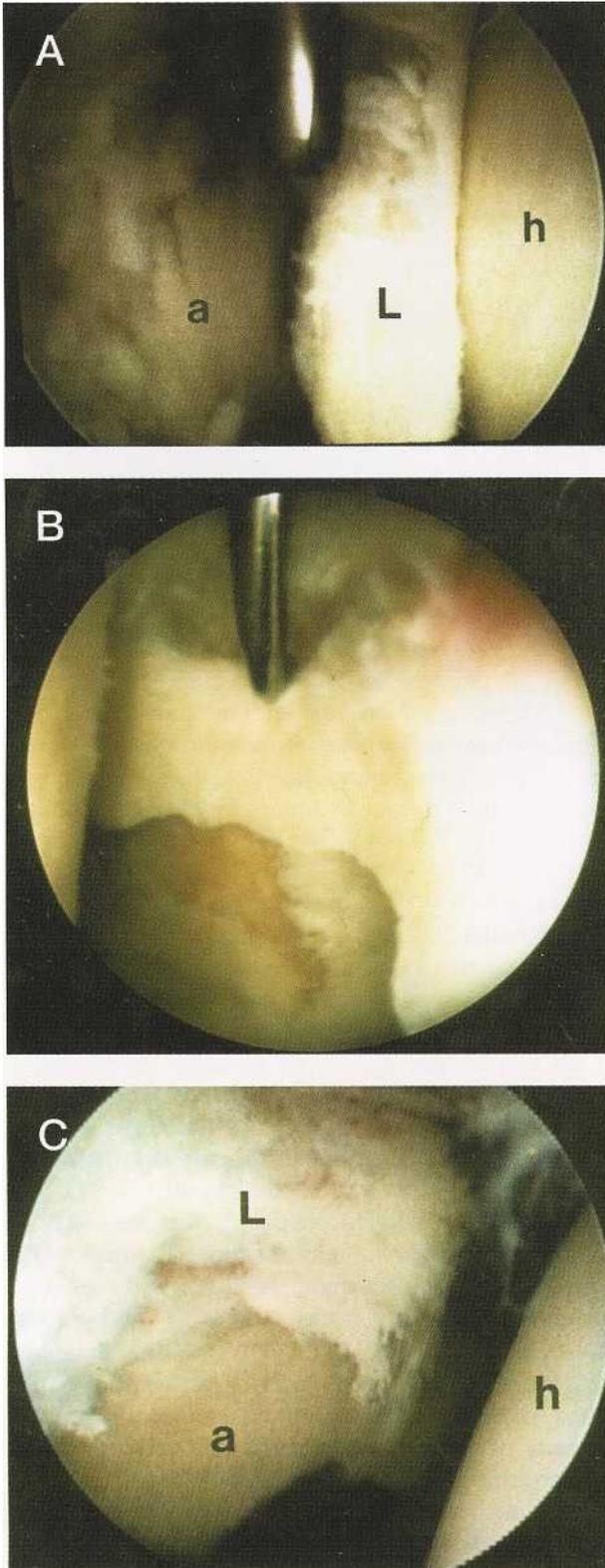
There were *3* patients with complications-2 sciatic and 1 pudendal nerve palsies. Neurological consultation was obtained for each of these patients and it was believed that these complications all represented traction or pressure palsies. These three neural deficits resolved completely with no residual functional nor sensory loss. All three of these patients had a good result at long-term follow-up.

DISCUSSION

Diagnosis of hip pain in a young adult is often challenging, particularly when routine radiographic evaluation fails to reveal a definitive diagnosis. Often, these patients report mechanical symptoms, such as clicking, popping, or catching. Although these symptoms are more commonly related to external causes, such as snapping of the iliotibiai band over the greater trochanter, an intra-articular cause such as an acetabular labral tear should be considered.[6] Anatomic studies have shown that the labrum is richly innervated with free nerve endings capable of nociception.[7]

The earliest reports were of acetabular labral tears following dislocation of the hip.[8,9] The labrum was noted to be a mechanical block to reduction of the joint. Harris et al.[l°] noted a subtype of the labrum, an inverted labrum, during total hip arthroplasty and postulated it to be a rare cause of osteoarthritis. In 1977, Altenbergi was the first to describe the tear of the acetabular labrum as a cause of hip pain. He described two patients, aged *61* and 57, who had significant relief of pain after the excision of the torn portion of the labrum. Dorrell and Catteralltl reported that patients with hip dysplasia can have these tears as an independent cause of hip pain and mechanical symptoms.

More recently, Fitzgerald[2] has documented a series of these labral tears, diagnosed primarily with physical examination and arthrography. All seven patients treated without surgery and *42* of *46* patients treated surgically had good results. He treated these tears with an open approach to the hip. Dislocation of the hip was

FIGURE 1.   Three examples of labral tears seen at arthroscopy. (A) The shaver adjacent to a bucket handle tear of the labrum that has displaced into the joint. Also note the degenerative changes in the acetabulum, while the femoral head appears normal. (B) The probe is inserted into a peripheral longitudinal tear of the acetabular labrum. Note injection of the labrum at the margin of the tear and grade IV chondromalacia of the acetabulum. (C) A degenerative tear of the acetabular labrum. The acetabulum in the background and the femoral head in the periphery of the image are free of chondromalacia. L, labrum, a, acetabulum, h, femoral head.
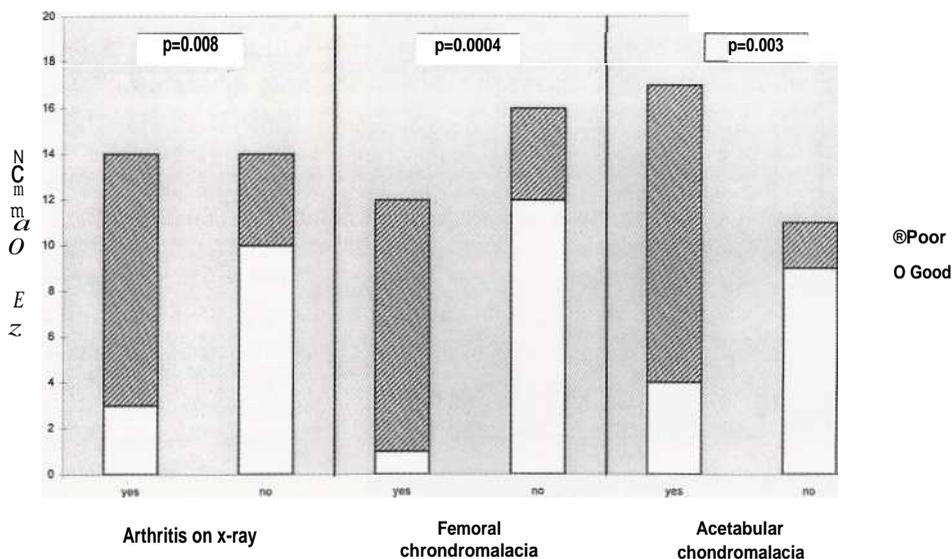
Patient Outcome

FIGURE 2.   Three factors correlated   with patient outcome (® poor, 0 good). Of those patients without evidence of arthritis on radiographs, 10 of 14 (71%) had a good result. Of those patients without arthroscopically determined femoral chondromalacia, 11 of 12 (92%) had a good result. Thirteen of 17 patients (82%) of patients without acetabular chondromalacia had a good outcome from arthroscopic labral debridement.

required in two thirds of the patients in order to identify the torn portion of the labrum. Despite the good outcome, 15 patients required additional surgery, primarily for symptoms related to the transtrochanteric approach he used. Although there was no incidence of osteonecrosis related to the procedure, dislocation of the hip for accessing the torn labrum is certainly an unappealing procedure for the young patient.

Arthroscopy of the hip has become a more widely accepted and performed procedure in the last 2 decades. Several authors have documented the use of hip arthroscopy first as a diagnostic modality, and more recently as a treatment for acetabular labral tears. [4,12-15]

The first goal of our study was to identify characteristic findings that would help in the diagnosis of acetabular labral tears. Only 36% of our 28 patients noted a specific traumatic event that initiated their symptoms. However, more than 50% of these patients have mechanical symptoms such as locking, clicking, or giving way. Careful physical examination will often localize the area of discomfort to the hip joint as opposed to the trochanteric areas. Although we could not find a correlation between specific findings on physical examination and the presence of labral tear, other authors report success with the so-called Thomas test.[z,4] This involves flexing both hips, then allowing the affected extremity to abduct, then extend. A positive test result is indicated by a palpable or audible click and the elicitation of pain with this maneuver. We found that current modalities for imaging the hip joint including arthrography and magnetic resonance imag-

ing were poor for directly identifying a labral tear (Fig 3). It may be that newer techniques, such as magnetic resonance imaging with intra-articular gadolinium enhancement, may prove more sensitive and specific. [16-1g] In our referral practice, the average duration of symptoms prior to arthroscopy was 25 months, indicating the difficulty in achieving a diagnosis in these cases.

At arthroscopy, the most commonly found tear type was the radial flap. The most common position to find a labral tear was in the anterior sector of the acetabulum. These results are in agreement with a recent report on labral tear classification, [19] but are in contrast to the earlier case reports of Japanese investigators who found posterior tears to be more frequent. [12,14,15] The frequent finding of an anterior labral tear emphasizes the need for an adequate posterior portal to visualize the anterior section of the joint.

From our data, it is clear that the presence of arthritis affects the long-term outcome of arthroscopy debridement of the acetabular labrum. Of those without arthritis shown on radiographs, 71% had a good result, whereas only 21% of those with radiographic evidence of arthritis had good results. Arthroscopic detection of chondromalacia was an even stronger indicator of poor long-term results. For those patients with arthritis who later underwent THA, the average interval from arthroscopy to THA was 14 months. It should be noted that 3 of 6 (50%) of these patients did initially note some improvement. Further study of all patients undergoing hip arthroscopy for the diagnosis
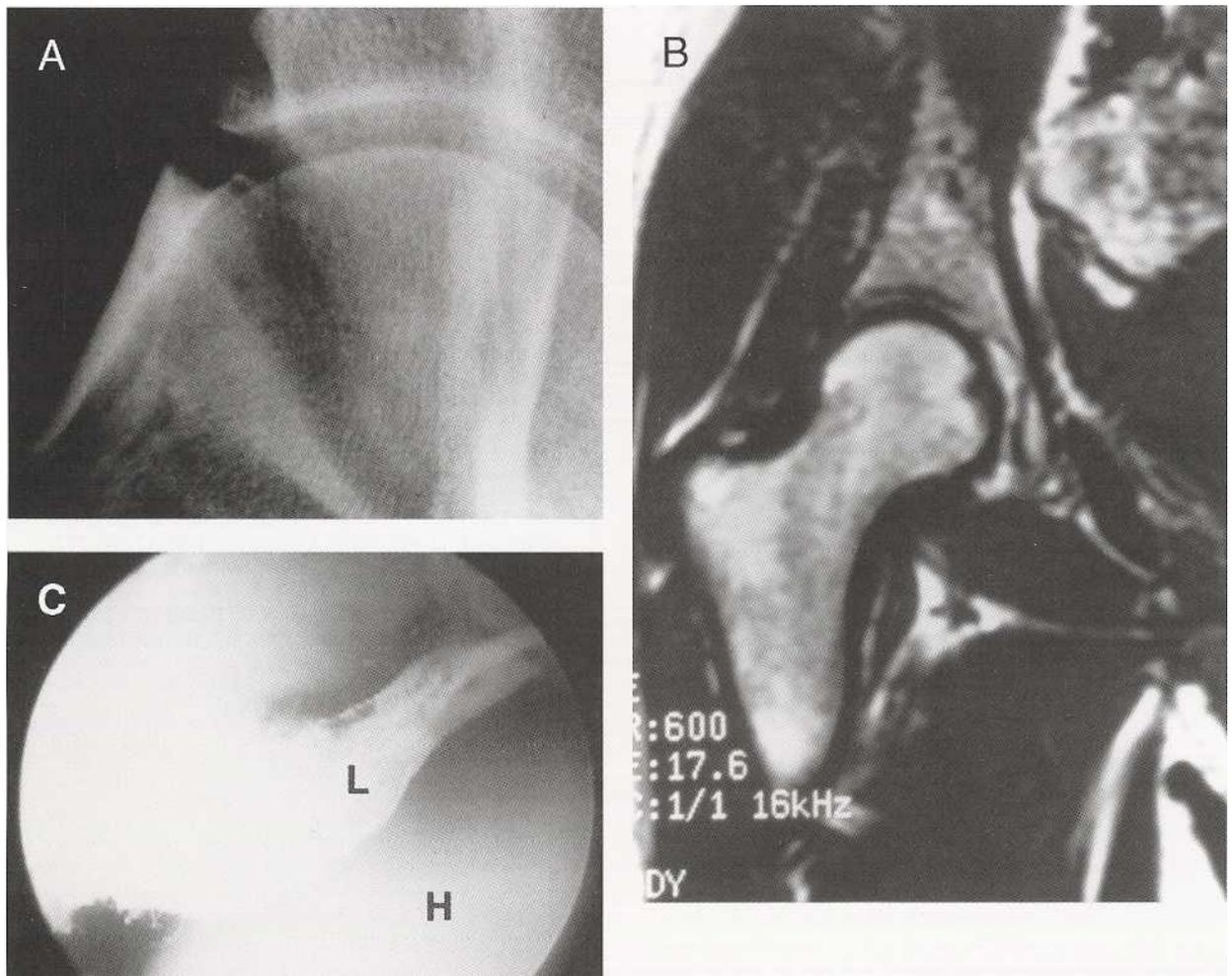
FIGURE 3.   (A) Arthrogram and (B) magnetic resonance image of a 27-year-old woman with a history of hip pain and clicking show no evidence of labral abnormality. (C) At arthroscopy, a radial flap tear of the labrum is found and debrided. (L) identifies the flap tear of labrum, (h) is the femoral head in the background.

of arthritis will need to be undertaken to determine whether the amount and duration of improvement of symptoms justifies the use of arthroscopic debridement for this diagnosis.

All three complications in this group of patients were the result of nerve traction neuropraxias, as have been reported in other series:[4,20] Fortunately, these resolved completely without any residual deficits. We feel that these traction injuries can be decreased by careful positioning of the perineal post before surgery and by prudent monitoring and minimization of the amount of traction applied to the extremity.

The method of determining patient outcome in this study is subject to error in that it relies on patients' subjective response to grade surgical results. Because of the significant variability of physical examination on patient presentation, objective measurements of patient signs are imprecise. However, the use of global outcome measure tools, such as the *SF-36,* administered before and after surgery, may provide more reliable data.[21] In addition, the natural history and outcome of conservative management of labral tears needs further research. Unfortunately, this is currently difficult because we do not yet have diagnostics that can reliably diagnose labral tears without arthroscopy.

In conclusion, in adults with hip pain, the diagnosis of acetabular labral tear should be considered, although a definitive diagnosis is not always possible. Arthroscopic debridement provides good results in those patients without radiographic evidence of arthritis. However, those patients with arthritis are less likely to have long-term relief of symptoms.

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