Clinical and Functional Outcome After Acetabular Labral Repair in Patients Aged Older Than 50 Years

Tomer Ben Tov, M.D., Eyal Amar, M.D., Amir Shapira, M.D., Ely Steinberg, M.D., Ehud Atoun, M.D., and Ehud Rath, M.D.

Purpose: To assess the clinical and functional outcome of labral repair in patients aged older than 50 years. Methods: We performed a prospective analysis of 20 patients aged older than 50 years who had undergone arthroscopic repair of a torn acetabular labrum (6 men and 14 women; mean age, 58 years). The indication for surgery was groin pain due to various causes with or without associated mechanical symptoms that did not respond to nonoperative treatment for more than 6 months. Intraoperatively, all patients were diagnosed with labral pathology. The mean duration of symptoms was 3.1 years (range, 0.5 to 15 years). The mean follow-up period was 22 months (range, 12 to 35 months). The outcome was prospectively measured with the modified Harris Hip Score (MHHS) and Hip Outcome Score (HOS). Results: The indication for surgery was femoroacetabular impingement (FAI) with cam deformity and a labral tear in 4 patients, FAI with pincer deformity and a labral tear in 1 patient, FAI with both deformities in 1 patient, a gluteus medius tear in 2 patients, and an isolated labral tear in 12 patients. Acetabular chondral lesions were present in 11 patients (55%). The mean preoperative and postoperative MHHS was 62.5 and 87.2, respectively (P < .001); the mean preoperative and postoperative HOS was 42.7 and 86.3, respectively (P < .001); and the mean preoperative and postoperative level of function during usual activities of daily living according to the HOS was 46.0% and 73.7%, respectively (P < .001). No significant difference was identified in MHHS and HOS between gender groups. Conclusions: Arthroscopic management of FAI and labral repair in patients aged older than 50 years without significant arthritis (Tönnis grade 1 or better) are associated with significant improvement in outcome. Because of the potential importance of the labrum for long-term hip joint integrity, we advocate repair of the labrum in patients aged older than 50 years when possible. Level of Evidence: Level IV, therapeutic case series.

Labral tears are the most common pathology in patients undergoing hip arthroscopy and the most common cause of mechanical symptoms, found in 22% to 55% of patients with hip pain. They appear to be highly prevalent in aging adult hips, found in more than 90% of cadaveric specimens with a mean age of 78 years. Labral tears usually occur early in the arthritic process of the hip and may be one of the causes of degenerative hip disease. Clinical, biomechanical, and finite-element model studies suggest that the acetabular labrum may have importance in maintaining hip joint integrity. It has been suggested that labral tears may lead to microinstability, decreased articular cartilage nutrition, increased cartilage consolidation, and reduced contact area, resulting in breakdown of the chondral surface.

When feasible, labral repair seems to be the optimal course of action to restore function. There are a few studies suggesting the benefit of labral repair as compared with partial labrectomy. Some studies have advocated that hip arthroscopy is rarely indicated for the “older” person because of the high incidence of degenerative changes. However, a literature search identified one article that specifically studied and endorsed hip arthroscopy in a middle-aged population (aged >50 years) with joint space narrowing of less than 2 mm.

The purpose of this study is to assess the clinical and functional outcome of labral repair in patients aged older than 50 years. Our hypothesis was that labral tear repair can relieve pain and improve function in patients aged older than 50 years.
Methods

The institutional review board approved the study protocol. Between January 2010 and December 2011, 112 patients underwent hip arthroscopy at our institute. We performed a prospective analysis of 22 patients who met the inclusion criteria. The inclusion criteria were age older than 50 years at the time of index procedure and intraoperative diagnosis of a labral tear that was subsequently repaired. Patients with preoperative radiographic evidence of arthritis (Tönnis grade 2 or greater) were excluded. All patients underwent arthroscopy of the hip by a single surgeon (E.R.) for the treatment of groin pain (due to various reasons, e.g., femoroacetabular impingement [FAI], labral tear, and gluteus medius tear) with or without associated mechanical symptoms who did not respond to nonoperative treatment comprising activity modification, nonsteroidal anti-inflammatory drugs, and physiotherapy for more than 6 months. All tears were nontraumatic; none of the patients had Workers’ Compensation cases. Dominant extremity and prior sporting activity data were not recorded. Intraoperatively, all patients were diagnosed with labral pathology. The mean duration of hip symptoms was 3.1 years (range, 0.5 to 15 years). All patients had painful range of motion of the hip joint and a positive anterior impingement test (pain provoked by flexion, adduction, and internal rotation). Preoperative imaging included plain radiographs (plain anteroposterior pelvis and frog-leg lateral views) and magnetic resonance imaging (MRI) arthrography in all patients. All MRI study findings were reported by a senior musculoskeletal radiologist and reviewed by the senior author.

Labral repair was performed if the labral tear was at the chondrolabral junction, good bleeding from the bony bed was achieved, and the labral tissue was without fraying or gross damage.

Acetabular rim resection was decided based on a combination of imaging and intraoperative findings consistent with pincer-type FAI. The criteria for diagnosis of pincer-type FAI included a positive crossover sign, ischial spine sign associated with retroversion, and lateral center-edge angle of Wiberg greater than 40°. No patient had radiographic evidence of coxa profunda. Cam-type FAI was present when the alpha angle was greater than 55° on plain radiographs.

Management of pincer-type FAI included resection of acetabular rim overcoverage, followed by labral refixation when appropriate. Osteoplasty of the femoral head-neck junction was performed in cases of cam-type FAI. In patients without femoral- or acetabular-side pathology, labral repair was performed after minimal debridement of the acetabular rim.

Surgical Technique

All arthroscopic procedures were performed with the patient in the supine position under general anesthesia on an orthopaedic traction table. A lateral portal was established under fluoroscopy, and then an anterolateral portal was created under arthroscopic visualization with the aid of fluoroscopic guidance if necessary. A capsulotomy between the 2 portals with a hooked radiofrequency probe (VAPR; DePuy Mitek, Raynham, MA) was then performed to facilitate instrument maneuverability. A thorough diagnostic evaluation of the hip was performed with the use of a 70° arthroscopic lens. Acetabuloplasty and rim trimming were performed if indicated. Acetabular chondral defects were classified as described by Outerbridge and treated by debridement of any unstable cartilage flaps. After bone debridement down to bleeding bone (indicated for all labral repairs to promote healing), labral tears were repaired with suture anchor fixation (Bioraptor, 2.9-mm anchors; Smith & Nephew Endoscopy, Andover, MA). The labrum was fixed with either a looped suture around the labrum or base fixation (also known as vertical mattress) using a single pass of the suture through the labrum, as shown in Fig 1.
Femoral osteoplasty of the head-neck junction was then carried out if needed.

Postoperatively, the labral repair patients were instructed not to bear weight for 3 weeks. Early range-of-motion exercises were encouraged to prevent soft-tissue adhesions and promote early recovery. Passive motion was first restored, followed by active motion and then strength.

**Postoperative Follow-Up**

Routine postoperative follow-up included daily inspection in the hospital and follow-up examination in the outpatient clinic at 2 weeks, 3 months, 6 months, and 1 year after surgery. Outcomes were prospectively measured with the modified Harris Hip Score (MHHS), Hip Outcome Score (HOS), and visual analog scale for pain preoperatively and at 6 weeks, 3 months, 6 months, and annually thereafter. Outcome scores were collected during clinic visits or by mail. All patients completed a standard clinical evaluation that included detailed clinical examination by the senior author. The level of function during usual activities of daily living according to the HOS was recorded as well. Our follow-up does not routinely include MRI.

**Statistical Analysis**

Statistical analysis of the data was carried out with paired and independent Student $t$ tests and the analysis-of-variance test for average comparison. Prevalence comparison was carried out by the $\chi^2$ test and Fisher exact test when appropriate. A significance level of .05 was used. SPSS software for Windows (version 19; IBM, Armonk, NY) was used for all analyses.

**Results**

We performed a prospective analysis of 22 consecutive patients who met the inclusion criteria. On analysis of the data, we excluded 2 patients who met the inclusion criteria: 1 patient required total hip replacement of the data, we excluded 2 patients who met the inclusion criteria. On analysis and 1 year after surgery. Outcomes were prospectively inspection in the hospital and follow-up examination in the outpatient clinic at 2 weeks, 3 months, 6 months, and 1 year after surgery. Outcomes were prospectively measured with the modified Harris Hip Score (MHHS), Hip Outcome Score (HOS), and visual analog scale for pain preoperatively and at 6 weeks, 3 months, 6 months, and annually thereafter. Outcome scores were collected during clinic visits or by mail. All patients completed a standard clinical evaluation that included detailed clinical examination by the senior author. The level of function during usual activities of daily living according to the HOS was recorded as well. Our follow-up does not routinely include MRI.

**Table 1. Preoperative and Postoperative Functional Data**

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>$P$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHHS</td>
<td>62.5 ± 3.22</td>
<td>87.2 ± 3.35</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Men</td>
<td>66.3 ± 5.59</td>
<td>84.23 ± 7.00</td>
<td>.013</td>
</tr>
<tr>
<td>Women</td>
<td>60.9 ± 3.96</td>
<td>88.45 ± 3.87</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>HOS</td>
<td>52.7 ± 5.48</td>
<td>86.3 ± 2.33</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Men</td>
<td>55.5 ± 13.3</td>
<td>87.2 ± 4.91</td>
<td>.024</td>
</tr>
<tr>
<td>Women</td>
<td>51.4 ± 5.76</td>
<td>86.0 ± 2.75</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Functional evaluation</td>
<td>46.0% ± 3.60%</td>
<td>73.7% ± 3.48%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Men</td>
<td>48.3% ± 4.94%</td>
<td>67.5% ± 4.96%</td>
<td>.032</td>
</tr>
<tr>
<td>Women</td>
<td>43.3% ± 4.75%</td>
<td>74.67% ± 4.46%</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note: Values are given as mean ± standard error.

Outerbridge type I and 5 patients had Outerbridge type II lesions; all lesions were peripheral, at the chondralabral junction; no further treatment was performed on any of the lesions). In 3 patients, the labral tear was diagnosed intraoperatively because the diagnosis of labral tear according to the MRI arthrogram was inconclusive. The mean follow-up time was 22 months (range, 12 to 35 months). The outcomes measures obtained at most recent follow-up were significantly improved compared with preoperative measures ($P < .001$) (Table 1).

The MHHS and HOS of all patients are shown in Fig 2. The mean preoperative and postoperative MHHS was 62.5 and 87.2, respectively ($P < .001$); the mean preoperative and postoperative HOS was 42.7 and 86.3, respectively ($P < .001$); and the mean preoperative and postoperative level of function during usual activities of daily living according to the HOS was 46.0% and 73.7%, respectively ($P < .001$). No significant difference was identified in outcome measures when we subdivided the study population into gender groups (Table 1).

The mean improvement in range of motion between the preoperative level and the level at follow-up was 7.3° in forward flexion, 5.6° in internal rotation, 3.1° in external rotation, and 2.8° in abduction. All improvements were not significant.

When we analyzed the clinical outcome of patients with FAI, a significant improvement was shown ($P < .001$) in all the measured scores. There was no significant difference in the preoperative MHHS, functional evaluation score, and HOS ($P = .242$, $P = .369$, and $P = .924$, respectively); in the postoperative MHHS, functional evaluation score, and HOS ($P = .326$, $P = .497$, and $P = .487$, respectively); and in the level of improvement as measured by the MHHS, functional evaluation score, and HOS ($P = .1$, $P = .88$, and $P = .594$, respectively) between patients with and without FAI. There was no significant difference in the preoperative MHHS, functional evaluation score, and HOS ($P = .863$, $P = .252$, and $P = .634$ respectively); in the postoperative MHHS, functional evaluation score, and HOS ($P = .146$, $P = .143$, and $P = .080$, respectively);
and in the level of improvement as measured the MHHS, functional evaluation score, and HOS (P = .174, P = .842, and P = .510, respectively) between patients with and without chondral lesions (Outerbridge types I and II). No major complications (neural injury, infection, or pressure sore) were identified in the record review. None of the patients required revision surgery or further surgical procedures at final follow-up or up until December 1, 2013.

Discussion

The purpose of this study was to report the clinical and functional improvement after acetabular labral repair in patients aged older than 50 years. We hypothesized that arthroscopic management of painful hips with labral tears in this population would result in improved outcome scores. In a series of 20 patients aged older than 50 years, 18 patients (90%) showed significant improvement after repair of the torn labrum with or without concomitant osteoplasty, regardless of gender and the presence of a chondral lesion.

A literature search yielded only 1 publication that focused specifically on the middle-aged population (aged >50 years). The authors evaluated 153 patients. After 3 years’ follow-up, 64 patients’ data were available. Patients with greater than 2 mm of joint space had survivorship of 90%, whereas those with 2 mm or less had survivorship of 57% (P < .001). Several publications have documented outcomes after hip arthroscopy for labral repair in the younger population. Kamath et al. evaluated 52 patients with a mean age of 42 years who underwent arthroscopic labral repair, with a mean follow-up period of 58 months. They showed overall percentages of good or excellent outcomes of 56% to 66%. Eighty-four percent of patients were able to return to sports or equivalent levels of preoperative recreational activity. They concluded that hip arthroscopy provides safe and reliable improvement of labral symptoms in most patients. Philippon et al. evaluated 112 patients with FAI, with a mean age of 40.6 years and a minimum follow-up period of 2 years. Of these patients, 58 underwent labral repair and 54 had labral debridement. The authors showed high patient satisfaction rates, as well as marked improvement in the functional score, and showed that the predictors of a better outcome were joint space narrowing of less than 2 mm and repair of labral pathology instead of debridement. Byrd and Jones reported the outcome of 100 patients with FAI, of whom 92 had labral tears. The mean age was 34 years, and the minimum follow-up period was 2 years. The authors reported favorable outcomes for the arthroscopic management of FAI and labral tears. Larson et al. evaluated 94 patients with FAI and labral tears and compared labral refixation with labral debridement/focal excision. The mean age of the patients was 32 years in the debridement group and 28 years in the labral refixation group. The mean follow-up period was 42 months. The authors showed that good to excellent results were obtained in 68% of patients in the focal excision/debridement group and 92% of those in the refixation group, and they concluded that labral repair was superior to debridement/excision in terms of clinical and functional results. Functional outcomes were better at both 1 and 2 years after surgery in patients treated with labral repair than in those treated with labral resection. The results in our study coincide with the results of the aforementioned studies.

When analyzing the clinical outcome in our study of patients with FAI, we showed a significant improvement. Furthermore, there was no significant difference in the level of improvement in all clinical measures between patients with FAI and those without FAI. These results are in concordance with the results of Haviv and O’Donnell, who studied the results of arthroscopic treatment for acetabular labral tears of the hip without bony dysmorphism. They reported the outcome of 81 patients with a mean age of 44 years and mean follow-up period of 3 years and concluded that
arthroscopic treatment for acetabular labral tears of the hip without dysplasia or bony impingement lesions has good short-term to midterm results.

The presence of pincer- or cam-type morphology in older patients with labral tears and minimal chondral damage raises the question of whether the labral tear is due to FAI or primary, independent, age-related pathology. In fact, it seems unlikely that labral tears in this group of patients are purely the result of FAI because one would expect an earlier onset of hip symptoms in such cases.

All outcome scores in our patient group improved significantly. However, when we looked at gender-specific outcomes, the improvement in women was more pronounced (albeit not significant). This can be explained by a higher preoperative MHHS and HOS in men, making the change in scores between the preoperative and postoperative improvement lower yet still considered good to excellent.

Evaluation of labral repairs is limited by the lack of a validated outcome instrument designed for the nonarthritic hip in active patients. This study shows the clinical and functional outcome after arthroscopic labral repair in patients aged older than 50 years. It shows marked and significant improvement (regardless of gender affiliation) in all clinical and functional measures. Although basic science research and clinical outcome studies suggest that labral repair is clinically better than partial labrectomy, more outcome studies are needed to confirm this finding in middle-aged patients.

Limitations

The limitations of this study include the lack of a control group, the size of the study population, and the short-term follow-up. The size of the study group constitutes a limitation because it makes our analysis vulnerable to statistical bias. The follow-up interval constitutes another limitation because a longer follow-up period may yield different outcomes.

Conclusions

Arthroscopic management of FAI and labral repair in patients aged older than 50 years without significant radiologic signs of arthritis (Tönnis grade 1 or better) are associated with significant improvement in outcome. Because of the potential importance of the labrum for long-term hip joint integrity, we advocate repair of the labrum in patients aged older than 50 years when possible. Age older than 50 years is not an absolute barrier to successful repair.

Acknowledgment

The authors thank Marc Safran, M.D., for his contribution and help in the manuscript review.

References


