

# Cartilage Defects Differentiate Patients Surviving and Failing Primary Hip Arthroscopy for Femoroacetabular Impingement Syndrome at Minimum 10-Year Follow Up

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**INTRODUCTION:** Identifying risk factors for secondary surgery following primary hip arthroscopy for femoroacetabular impingement syndrome (FAIS) is critical. Age and osteoarthritis have been shown to increase the rate of subsequent revision hip arthroscopy (RHA) and total hip arthroplasty (THA). The aims of the present study are 1) to identify factors associated with secondary surgery when controlling for age, sex, and body mass index, 2) to evaluate the timing of secondary surgery, and 3) to compare patient-reported outcome (PRO) scores between those requiring a secondary surgery and those not requiring a secondary surgery.

**METHODS:** A prospectively collected and retrospectively analyzed single surgeon clinical repository was evaluated for cases of primary hip arthroscopy for FAIS between January 2012 and February 2013 with minimum 10-year follow up. Patients who underwent secondary surgery were propensity matched 1:4 to patients who did not undergo secondary ipsilateral hip surgery. Age, sex, and body mass index were controlled in the analysis. Patients in the reoperation and non-reoperation groups were compared on the basis of preoperative demographics, pre- and postoperative radiographs, intraoperative findings, operative procedures performed, and PRO scores. PROs include Hip Outcome Score – Activities of Daily Living (HOS-ADL), Hip Outcome Score – Sport Scale (HOS-SS), modified Harris Hip Score (mHHS), International Hip Outcome Tool (iHOT-12), Visual Analog Scale for Pain (VAS Pain), and Visual Analog Scale for Satisfaction (VAS Satisfaction). A Kaplan-Meier survivorship curve was generated, and a subgroup analysis was performed to compare the early (< 3.75 years) and late (≥ 3.75 years) reoperation groups.

**RESULTS:** Twenty-four reoperation patients (67% female; age 40.1 ± 14.3 years; BMI 27.2 ± 5.5 kg/m<sup>2</sup>) were matched to 96 non-reoperation patients (62% female; age 37.0 ± 10.8 years; BMI 25.2 ± 4.7 kg/m<sup>2</sup>, p ≥ 0.111). Mean follow up was 10.3 ± 0.23 years. No preoperative differences were found between groups, including no difference in Tönnis Grade (p ≥ 0.122). The reoperation group showed significantly more moderate to severe cartilage defects noted intraoperatively (p ≤ 0.016) with no difference in the procedures performed between groups (p ≥ 0.253). Both groups showed improvement in most PROs at 1-year postoperatively, yet the reoperation group showed significantly lower preoperative, 1-year, and 2-year postoperative HOS-SS, VAS Pain, and HOS-SS scores, respectively (p ≤ 0.045). A bimodal distribution of time to reoperation was evidenced independent of the secondary surgery performed. Early reoperation (interval < 3.75 years) trended toward an increased prevalence of preoperative chronic pain and back pain; although, no significance was achieved (p ≥ 0.142).

**DISCUSSION AND CONCLUSION:** Patients requiring secondary surgery following primary hip arthroscopy for FAIS are shown to have more moderate to severe cartilage defects noted during the index procedure and lower preoperative, 1-year, and 2-year HOS-SS, VAS Pain, and HOS-SS scores, respectively. Identification of high-grade cartilage defects and lower early PRO scores can aid in counseling patients on their risk of requiring subsequent surgery.

Table 3. Intraoperative findings.

|  | Reoperation | No Reoperation | p-Value  |
|--|-------------|----------------|----------|
| <b>Acetabular Cartilage (Beck Grade)</b>   |             |                | 0.016*   |
| Grade 0 (Normal)                           | 41.7%       | 66.7%          |          |
| Grade 1 (Malacia)                          | 4.2%        | 8.3%           |          |
| Grade 2 (Debonding)                        | 8.3%        | 10.4%          |          |
| Grade 3 (Cleavage)                         | 12.5%       | 6.2%           |          |
| Grade 4 (Defect)                           | 33.3%       | 8.3%           |          |
| <b>Femoral Head Cartilage (ICRS Grade)</b> |             |                | < 0.001* |
| Grade 0 (Normal)                           | 45.8%       | 87.5%          |          |
| Grade 1 (Malacia)                          | 4.2%        | 1.0%           |          |
| Grade 2 (Debonding)                        | 0.0%        | 2.1%           |          |
| Grade 3 (Cleavage)                         | 20.8%       | 2.1%           |          |
| Grade 4 (Defect)                           | 29.2%       | 7.3%           |          |

ICRS: International Cartilage Repair Society. \* Indicates significance at a predetermined significance level of 0.05.

