**Introduction**

The diagnosis and treatment of femoroacetabular impingement (FAI) has become widely accepted. Femoral cam and acetabular pincer lesions likely represent the underlying cause of FAI in the majority of symptomatic patients. However, FAI may also result from excessive retroversion of the femoral neck. A patient with a retroverted femoral neck may experience impingement on the acetabulum with minimal internal rotation of the hip. Tomnis and Heinecke have previously described the syndrome of diminished femoral antetorsion where the femoral neck is abnormally retroverted and the patient displays reduced internal and increased external range of motion of the hip. They reported that this torsional abnormality of the femur was a cause of hip pain and early onset hip osteoarthritis.

Ito et al performed MRI studies on patients with symptomatic FAI and compared both femoral neck anteversion and femoral head-neck offset to age and sex matched controls. They found that, in addition to reduced femoral head-neck offset, many patients with symptomatic FAI also had reduced femoral antetorsion. Dolan et al evaluated CT scans on 135 patients with acetabular labral tears to determine if these patients had underlying structural abnormalities of the hip that could cause for the labral tear. They found that 90% of patients had an underlying structural abnormality and 13% of patients had femoral antetorsion of less than 5 degrees.

Surgical hip dislocation with osteochondroplasty remains the gold standard treatment for FAI. Although this treatment is very effective in restoring normal femoral head-neck offset, it does not address any underlying torsional deformity of the femur. We postulated that patients that had surgical hip dislocation with osteochondroplasty for FAI would have a worse clinical outcome if they also had femoral retroversion. We therefore designed this retrospective study to compare improvements in Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores after surgical hip dislocation and osteochondroplasty in patients with normal femoral antetorsion to patients with decreased femoral antetorsion (i.e., femoral retroversion). The aim of our study was to determine if patients with femoral retroversion have equivalent outcomes after surgical hip dislocation for Femoral Acetabular Impingement (FAI) as compared to those with normal femoral version.

**Methods**

Thirty-eight patients (43 hips) that underwent surgical hip dislocation for treatment of FAI were identified retrospectively. All patients had pre-operative CT and/or MRI scans to measure femoral antetorsion. Patients were divided into two groups based on femoral antetorsion: 1) those with femoral retroversion (anteversion < 10 degrees) (n=18), and 2) those with normal femoral anteversion (anteversion ≥ 10 degrees and < 25 degrees) (n=25). Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores were obtained prior to surgery and then at one and two years post-operatively. A paired t-test was used to compare WOMAC scores prior to surgery to those at one year, and scores at one year to scores at two years (Table 1).

**Results**

Twenty-five hips (44.6%) were found to have normal femoral antetorsion (anteversion ≥ 10 degrees and < 25 degrees), 18 hips (32.1%) were found to have femoral retroversion (anteversion < 10 degrees), and 13 hips (23.2%) were found to have femoral anteversion (anteversion ≥ 25 degrees). There was no significant difference in age, gender, side, length of follow up, or pre-operative WOMAC scores between patients with normal femoral antetorsion and those with femoral retroversion (Table 1). The mean femoral anteversion was 15.6 degrees ± 6.3 degrees for hips with normal femoral version and 3.3 degrees ± 3.4 degrees for hips with femoral retroversion.

Patients with normal femoral antetorsion had significant improvements in pain (p=0.01), function (p=0.04) and total (p=0.03) WOMAC scores at one year as compared to their pre-operative WOMAC scores (Table 2). There were no significant differences in any WOMAC scores between one and two years for patients with normal femoral antetorsion. There were no significant differences in WOMAC scores between pre-operative and one year, or between one and two years for hips with femoral retroversion. (Table 3).

**Discussion**

We found significant improvements in WOMAC scores after surgical hip dislocation and osteochondroplasty in FAI patients with normal femoral antetorsion. Patients that had femoral retroversion did not have significant improvements in WOMAC scores. Patients with FAI and femoral retroversion may continue to experience hip impingement symptoms after osteochondroplasty as they continue to impinge secondary to their femoral retroversion. This may be an explanation for the poor post-operative WOMAC scores in patients with femoral retroversion.

**Significance**

Femoral retroversion may negatively affect outcomes for FAI surgery. Early identification of patients with concurrent femoral retroversion and FAI will help guide clinical and surgical decision making.

**References**