

# What the Papers Say

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## ABSTRACT

The Journal of Hip Preservation Surgery (JHPS) is not the only place where work in the field of hip preservation may be published. Although our aim is to offer the best of the best, we continue to be fascinated by work that finds its way into journals other than our own. There is much to learn from it so JHPS has selected six recent and topical articles for those who seek a brief summary of what is taking place in our ever-fascinating world of hip preservation. What you see here are the mildly edited abstracts of the original articles, to give them what JHPS hopes is a more readable feel. If you are pushed for time, what follows should take you no more than 10 min to read. So here goes . . .

### IS THERE A RELATIONSHIP BETWEEN FEMORAL NECK ANTEVERSION AND LESSER TROCHANTERIC RETROVERSION IN PATIENTS WITH ISCHIOFEMORAL IMPINGEMENT?

Abnormality of femoral neck version may cause ischiofemoral impingement and the Hip Preservation Centre at Baylor University, Dallas, have explored this relationship in their recent publication(1).

In a retrospective observational study the authors measured the femoral neck version (FNV) and lesser trochanteric version (LTV) in symptomatic patients with ischiofemoral impingement (IFI) and compared this with asymptomatic hips. They excluded patients with isolated intra-articular pathology, prior hip fracture, and lesser trochanter deformity. The FNV, LTV, ischiofemoral space, and quadratus femoris space were evaluated on axial magnetic resonance imaging, as well as the angle between the LTV and the FNV. Independent t-tests were used to determine differences between groups. Data from 11 out of 15 symptomatic patients and 250 out of 320 asymptomatic patients were analysed. The mean ischiofemoral space (11.9 v 22.9 mm;  $P < .001$ ) and the mean quadratus femoris space (7.2 mm v 14.9 mm;  $P < .001$ ) were significantly smaller in symptomatic patients versus asymptomatic patients. There was no difference in mean LTV between groups, however the mean FNV ( $21.7^\circ$  v  $14.1^\circ$ ;  $P = 0.02$ ) and the angle between the FNV and LTV on average

( $45.4^\circ$  v  $38.3^\circ$ ;  $P = .01$ ) were significantly higher in symptomatic than in asymptomatic patients.

The authors concluded that the mean femoral neck anteversion and the mean angle between the FNV and LTV are significantly higher in patients with symptomatic IFI; which may need addressing when treating patients with deep gluteal pain caused by IFI.

### WHAT IS THE SAFE AMOUNT OF RESECTION DURING FEMORAL OSTEOPLASTY FOR FEMOROACETABULAR IMPINGEMENT?

Researchers from Australia(2) have attempted to quantify the safe resection amount during femoral osteochondroplasty to decrease the risk of fracture.

Resection of up to 30% of the anterolateral head-neck junction has previously been considered to be safe. However, iatrogenic fractures have been reported with resections within these limits.

The authors re-evaluated the amount of safe resection at the anterolateral femoral head-neck junction using a biomechanically consistent model. In total, 28 composite bones were studied in four groups: control, 10% resection, 20% resection and 30% resection. An axial load was applied to the adducted and flexed femur. Peak load, deflection at time of fracture and energy to fracture were assessed using comparison groups. There was a marked difference in the mean peak load to fracture between the control group and the 10% resection group ( $p < 0.001$ ). The control group

also tolerated significantly more deflection before failure ( $p < 0.04$ ). The mean peak load ( $p = 0.172$ ), deflection ( $p = 0.547$ ), and energy to fracture ( $p = 0.306$ ) did not differ significantly between the 10%, 20%, and 30% resection groups. Any resection of the anterolateral quadrant of the femoral head-neck junction for FAI significantly reduces the load-bearing capacity of the proximal femur. After initial resection of cortical bone, there is no further relevant loss of stability regardless of the amount of trabecular bone resected. Based on the findings the authors recommended that patients who undergo anterolateral femoral head-neck junction osteoplasty should be advised to modify their post-operative routine until cortical remodelling occurs to minimise the subsequent fracture risk.

#### DOES MENTAL HEALTH AFFECT OUTCOME AFTER SURGERY FOR FEMOROACETABULAR IMPINGEMENT (FAI)?

In a multi-centre collaborative study from units in Honolulu, Germany and Chicago<sup>(3)</sup> authors have attempted to determine the effect of psychiatric comorbidity on outcomes with femoroacetabular impingement surgery in military personnel.

A retrospective review was performed on active-duty patients at one institution undergoing surgery for femoroacetabular impingement over five years. Medical records were reviewed for demographic characteristics, radiographic data, and history of mental health medication use. Return-to-duty status was considered the primary outcome measure. Outcome scores obtained included modified Harris hip scores, Single Assessment Numeric Evaluation scores, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores, patient satisfaction, and Veterans RAND-12 scores. Patients taking mental health medication were compared with those who were not with regard to return to duty and validated patient-reported outcome measures.

Ninety-three patients (mean age, 32.2 years) were available for follow-up at a mean duration of 3.6 years. Of the seventeen patients discharged from service postoperatively, twelve (71%) were taking mental health medications. One-third (twenty-five) of seventy-six patients who returned to duty were taking mental health medication and this difference was significant ( $p < 0.006$ ).

Patients taking mental health medication had significantly poorer modified Harris hip scores ( $p < 0.02$ ), WOMAC scores ( $p < 0.0008$ ), and Veterans RAND-12 mental scores ( $p < 0.001$ ). Antidepressant, antipsychotic, and multiple mental health medication use were all predictive of medical discharge due to hip pain.

The authors concluded that psychiatric comorbidities are an important risk factor in active-duty military personnel undergoing surgery for femoroacetabular impingement. Mental health medication use is associated with poorer outcome scores and can significantly lower the possibility of returning to active-duty status.

#### USEFULNESS OF MR ARTHROGRAPHY OF THE HIP WITH LEG TRACTION IN THE EVALUATION OF LIGAMENTUM TERES INJURIES

Spanish researchers<sup>(4)</sup> have conducted a retrospective evaluation of the diagnostic accuracy of magnetic resonance (MR) arthrography of the hip with leg traction in the evaluation of ligamentum teres lesions and to assess whether there is increased articular distraction, possibly indicating secondary instability, in hips with ligamentum teres injuries.

MR arthrograms of the hip with leg traction of 184 consecutive patients, including 108 men (mean age, 32.6 years; range 19-53) and 76 women (mean age, 38.5 years; range, 18-56), who underwent hip arthroscopy were assessed for the presence of ligamentum teres lesions. The MR arthrographic findings were independently assessed by two radiologists who were blinded to the arthroscopic results. The inclusion criteria stipulated no previous surgery, arthroscopy within one month after MR arthrography, and availability of a detailed surgical report with ligamentum teres findings. The arthroscopy findings served as the reference standard. Sensitivity, specificity, accuracy, and K statistics for interobserver and intraobserver agreement were calculated.

At arthroscopy, 32 ligamentum teres injuries were found. The ligamentum teres was normal in 152 (82.6%) patients and had suffered low-grade partial tears in 15 (8.1%) patients, high-grade partial tears in 10 (5.4%) patients, and complete ruptures in 7 (3.8%) patients. MR arthrography with axial traction demonstrated moderate sensitivity and high specificity for both low-grade (62/93%) and high-grade (66/96%) partial tears. Grouping low- and high-grade partial tears increased the diagnostic performance of MR arthrography, yielding a sensitivity of 87% and a specificity of 95%. For complete ligamentum teres tears, MR arthrography with leg traction demonstrated high sensitivity (92%) and specificity (98%). Articular distraction was significantly increased in patients with complete ruptures of the ligamentum teres ( $p = 0.001$ ).

The authors concluded that MR arthrography with leg traction offers accurate diagnosis of ligamentum teres injuries. Patients with complete tears of the ligamentum teres exhibit increased articular distraction that may indicate secondary hip instability.

### IS QUALITY OF LIFE FOLLOWING HIP ARTHROSCOPY IN PATIENTS WITH CHONDROLABRAL PATHOLOGY ASSOCIATED WITH IMPAIRMENTS IN HIP STRENGTH OR RANGE OF MOTION?

Kemp et al(5) from the Australian Centre for Research into Injury and Sport and its Prevention (ACRISP) postulated that if physical impairments that are associated with poorer outcomes can be identified in people with chondrolabral hip pathology, then rehabilitation programmes that target such modifiable impairments could potentially be established to improve quality of life. The aim of this study was to examine the relationship between quality-of-life PROs and physical impairment measurements in people with chondrolabral pathology post-hip arthroscopic surgery.

This was a cross-sectional study where multiple stepwise linear regression analyses were conducted to determine which physical impairment measurements were most associated with poorer quality-of-life patient-reported outcomes (PROs). Eighty-four patients (42 women; all aged 36+/- 10 years) with hip chondrolabral pathology 12- to 24-month post-hip arthroscopy were included. The Hip Disability and Osteoarthritis Outcome Score Quality-of-life (HOOS-Q) subscale and International Hip Outcome Tool (IHOT-33) PROs were collected. Measurements of active hip ROM and strength were assessed.

The authors found that modifiable post-surgical physical impairments were associated with PRO in patients with chondrolabral pathology. Greater hip flexion ROM was independently associated with better scores in both HOOS-Q and IHOT-33 (adjusted  $r^2$  values ranged from 0.249 to 0.341). Greater hip adduction strength was independently associated with better HOOS-Q and IHOT-33 (adjusted  $r^2$  0.227-0.317). Receiver Operator Curve analyses determined that the limit value for hip flexion ROM was  $100^\circ$  (sensitivity 92%, specificity 75%), and hip adduction strength was 0.86Nm/kg (sensitivity 96%, specificity 70%).

The study concluded that the hip flexion ROM and adduction strength were associated with better quality-of-life PRO scores in patients with chondrolabral pathology 12- to 24-month post-hip arthroscopy. Rehabilitation programmes should target these to improve outcome.

### MRI FEATURES SUGGESTIVE OF BORDERLINE DYSPLASIA OF HIP

Research performed in the University of Bern(6) has looked at the MRI scan relationship of iliocapsularis and rectus femoris to identify features suggestive of hip

dysplasia. The iliocapsularis muscle is an anterior hip structure that appears to function as a stabiliser in normal hips and has been shown to be hypertrophied in developmental dysplasia of the hip (DDH). The authors proposed that an MR-based measurement of the ratio of the size of the iliocapsularis to that of adjacent anatomical structures such as the rectus femoris muscle might be helpful in everyday clinical use.

The study retrospectively compared the anatomy of the iliocapsularis muscle between two groups with symptomatic hips with different acetabular coverage and a control group with asymptomatic hips. The study groups were selected from a series of patients seen at the outpatient clinic for DDH or femoroacetabular impingement. The allocation to a study group was based on conventional radiographs: the dysplasia group was defined by a lateral center-edge (LCE) angle of  $< 25^\circ$  with a minimal acetabular index of  $14^\circ$  and consisted of 45 patients (45 hips); the pincer group was defined by an LCE angle exceeding  $39^\circ$  and consisted of 37 patients (40 hips). The control group consisted of 30 asymptomatic hips (26 patients) with MRIs performed for nonorthopaedic reasons. The anatomy of the iliocapsularis and rectus femoris muscle was evaluated using MR arthrography of the hip and the following parameters: cross-sectional area, thickness, width, and circumference. The iliocapsularis-to-rectus-femoris ratio of these four anatomical parameters was then compared between the two study groups and the control group. The diagnostic performance of these ratios to distinguish dysplasia from protrusio was evaluated by calculating receiver operating characteristic (ROC) curves and the positive predictive value (PPV) for a ratio  $> 1$ . Evaluation of radiographs and MRIs was performed in a blinded fashion.

The iliocapsularis-to-rectus-femoris ratio for cross-sectional area, thickness, width, and circumference was increased in hips with radiographic evidence of DDH (ratios ranging from 1.31 to 1.35) compared with pincer (ratios ranging from 0.71 to 0.90;  $p < 0.001$ ) and compared with the control group, the ratio of cross-sectional area, thickness, width, and circumference was increased (ratios ranging from 1.10 to 1.15;  $p$  ranging from 0.002 to 0.039). The area under the ROC curve ranged from 0.781 to 0.852. For a one-to-one iliocapsularis-to-rectus-femoris ratio, the PPV was 89% for cross-sectional area; 77% for thickness, 83% for width, and 82% for circumference.

The authors concluded that the iliocapsularis-to-rectus-femoris ratio is a valuable secondary sign of DDH and this parameter can be used as an adjunct for clinical

decision-making in hips with borderline hip dysplasia and a concomitant cam-type deformity to identify the predominant pathology.

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