

# What the papers say

Ali Bajwa

Consultant Orthopaedic Surgeon, Villar Bajwa Practice, Princess Grace Hospital, 30 Devonshire Street, London W1G 6PU, UK.  
E-mail: enquiries@villarbjajwa.com

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 subjects for those who seek a 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 . . .

## MID-TERM OUTCOMES OF ARTHROSCOPIC-ASSISTED CORE DECOMPRESSION OF PRECOLLAPSE OSTEONECROSIS OF FEMORAL HEAD-MINIMUM OF 5-YEAR FOLLOW-UP

Authors from MA, USA [1] describe the mid-term outcomes of arthroscopic-assisted core decompression of pre-collapse osteonecrosis of the femoral head (ONFH) with a minimum of 5-year follow-up. ONFH is a progressive disease that leads to collapse and the development of secondary arthritis. The preferred management of ONFH remains controversial. Arthroscopic-assisted management of ONFH is a new and evolving approach for hip preservation. They hypothesized that arthroscopy is able to improve ONFH outcomes by achieving accurate and minimally invasive decompression while successfully addressing concomitant intra-articular pathologies resulting in reliable mid-term outcomes.

This was a retrospective cohort analysis. All patients had atraumatic ONFH with a pre-collapse lesion and a minimum follow-up of 5 years. A total cohort of 11 hips (8 patients) was identified. The mean patient follow-up was 7 years (range 64–118 months). The Ficat-Arlet classification found on preoperative imaging was Stage I-3 (27.2%), Stage IIa-4 (36.4%) and Stage IIb-4 (36.4%) hips. Four

(36.4%) hips experienced mechanical issues, including locking, catching and buckling. The most common concomitant pathology addressed at the time of arthroscopy, was labral repair/debridement in eight cases (73%), followed by microfracture in seven cases (64%). At final follow-up, six hips (54.5%) had not converted to Total Hip Arthroplasty (THA). Upon further stratification, Stage I-100%, Stage IIa-75%, for a combined 87%, had not converted to THA; in contrast, 100% of hips categorized as Stage IIb had converted to THA. Ficat-Arlet staging, especially Stage IIb, was significantly associated with conversion to THA. There were 0% major or minor complications.

The authors believe this to be the longest reported follow-up of arthroscopic-assisted management of ONFH. Arthroscopic-assisted management is a promising surgical approach that provides safe, accurate and minimally invasive decompression, resulting in reliable results with an acceptable conversion rate to THA.

## AN ANATOMICAL STUDY OF THE ANTEROSUPERIOR CAPSULAR ATTACHMENT SITE ON THE ACETABULUM

In a cadaver study undertaken in Tokyo and Kitakyushu in Japan, Tsutsumi *et al.* [2] investigated the anterosuperior capsular attachment site on the acetabulum. Despite the fact that many surgeons perform partial capsular detachment from the anterosuperior aspect of the acetabulum to correct acetabular deformities during hip arthroscopy; few studies have focused on whether these detachments influence hip joint stability. The authors hypothesized that the attachment on the inferior aspect of the anterior inferior iliac spine (AIIS) is wide and fibrocartilaginous and might have a substantial role in hip joint stability.

Fifteen hips from nine cadavers of Japanese donors were analyzed. Eleven hips were analyzed macroscopically, and the other four were analyzed histologically. In all specimens, the 3D morphology of the acetabulum and AIIS was examined using micro-computed tomography (micro-CT).

Macroscopic analysis showed that the widths of the capsular attachments varied according to the location, and the attachment width on the inferior edge of the AIIS was significantly larger than that on the anterosuperior aspect of the acetabulum. Moreover, the capsular attachment on the inferior edge of the AIIS corresponded with the impression, which was identified by micro-CT. Histological analysis revealed that the hip joint capsule on the inferior edge of the AIIS attached to the acetabulum adjacent to the proximal margin of the labrum. In addition, the hip joint capsule attached to the inferior edge of the AIIS via the fibrocartilage.

The authors concluded that the capsular attachment on the inferior edge of the AIIS was characterized by an osseous impression, large attachment width, and distributed fibrocartilage. It appeared that the capsular attachment on the inferior edge of the AIIS was highly adaptive to mechanical stress, on the basis of its osseous impression, attachment width and histological features. Anatomical knowledge of the capsular attachment on the inferior edge of the AIIS provides a better understanding of the pathological condition of hip joint instability.

#### **ARTHROSCOPIC DOUBLE SHOELACE CAPSULAR PPLICATION TECHNIQUE FOR THE TREATMENT OF BORDERLINE HIP DYSPLASIA ASSOCIATED WITH CAPSULAR LAXITY**

Authors from the USA and Japan [3] describe a new technique for capsular closure. Hip arthroscopy is an innovative surgical tool that is minimally invasive; however, the working space is very limited because of small surgical wounds. Recent literature has shown that capsular repair after capsulotomy during hip arthroscopy facilitates the restoration of hip joint stability. Previous Technical Notes have introduced the shoelace capsule closing technique using a single Ultratape. However, even with the shoelace capsule closing technique, the authors periodically encountered difficult cases with extensive capsular laxity. In this Technical Note, they introduce an improved hip capsule plication technique using two pieces of Ultratape for treating borderline hip dysplasia with capsular laxity. This double shoelace capsule plication technique theoretically reduces tearing risks during closure of delicate and fragile capsules.

#### **REPAIRED OR UNREPAIRED CAPSULOTOMY AFTER HIP ARTHROSCOPY: A SYSTEMATIC REVIEW AND META-ANALYSIS OF COMPARATIVE STUDIES**

Authors from Chengdu, China [4] conducted a systematic review and meta-analysis comparing the surgical techniques, clinical outcomes, rates of revision and conversion to

arthroplasty and complications between a repaired and unrepaired capsulotomy after hip arthroscopy.

A search of the Pubmed, Embase and Google scholar databases was performed to identify comparative articles published prior to 10 July 2019 that reported the capsule management strategy and clinical outcomes after hip arthroscopy. A narrative analysis and meta-analysis were performed to integrate and compare the results of the two groups.

Twelve comparative studies ( $n = 1185$  hips) with an average (methodological index for non-randomized studies) minors score of  $17.459 (\pm 2.02)$  were identified for analysis, of which five were included in the meta-analysis. The pre- to post-operative improvements in the modified Harris Hip Score, Hip Outcome Score—Sport-Specific subscale and Hip Outcome Score—Activities of Daily Living revealed no significant differences between the repaired and unrepaired groups. The risk ratio of the revision rate was 0.66 and there was no difference between the two groups. Evaluation of the MRI scans and the rate of heterotopic ossification also showed no significant differences. The most preferred capsulotomy techniques were inter-portal and T-shape. No post-operative hip instability was reported in any of the 12 studies.

The currently published evidence is still not strong enough to confirm the superiority of repairing the capsule after hip arthroscopy; hence, the authors concluded that routine repair of the capsule during surgery cannot be suggested.

#### **POST-OPERATIVE MRI FINDINGS AND ASSOCIATED PAIN CHANGES AFTER ARTHROSCOPIC SURGERY FOR FEMOROACETABULAR IMPINGEMENT**

In this study from San Francisco, USA and Munich, Germany, Foreman *et al.* [5] describe the post-operative MRI findings and associated pain changes after arthroscopic surgery for femoroacetabular impingement (FAI). The purpose of this study was to describe post-operative MRI findings after FAI surgery in correlation with pain changes and surgical findings. The authors prospectively enrolled 42 patients (43 hips) who were scheduled for FAI surgery. Pre- and post-operative MR images were obtained using a 3-T MRI system. Changes in pain scores were assessed using the hip dysfunction and osteoarthritis outcome score. MR images were evaluated for the presence of acetabuloplasty or femoroplasty, presence of chondral and labral repair surgery, bone marrow edema, subchondral cysts, chondral defects, labral tears, capsular defects and effusion. The optimal orientation to detect these changes was noted. Imaging findings were compared with pain score changes

using linear regression analysis. Sensitivity and specificity were assessed using surgical correlation as the reference standard.

Increased acetabular bony debridement length was associated with decreased improvement in pain scores (coefficient:  $-2.07$ ; 95% CI:  $-3.53$  to  $-0.62$ ), whereas other imaging findings were not significantly different. Femoroplasty and capsular alterations were best detected on oblique axial sequences; acetabuloplasty and cartilage and labral repair were best seen on sagittal sequences. MRI showed excellent sensitivity (100%) and specificity (100%) for detecting labral repair and excellent sensitivity for detecting femoroplasty (98%). Sensitivity and specificity were lower for detecting acetabuloplasty (83 and 80%, respectively) and chondral repair (75 and 54%, respectively). The authors concluded that arthroscopic acetabuloplasty showed a greater association with post-operative pain than did other aspects of surgical correction for FAI. Femoroplasty and labral repair were reliably diagnosed on 3-T MRI; however, limitations were found in the evaluation of acetabular chondral repair.

#### CLINICAL RELEVANCE OF THE LIGAMENTUM TERES: A LITERATURE REVIEW

In this study from Pittsburgh and Columbus, USA, the clinical relevance of the ligamentum teres (LT) was explored by Martin *et al.* [6] in a literature review. The LT continues to be a structure of debate and interest. Previously thought of as a vestigial structure, an awareness of LT pathology and its potential importance has increased with the expansion of hip arthroscopy. The authors attempt to provide a comprehensive literature synthesis on the LT and provide clinicians with the most current research regarding the LT and its anatomical features, functional relevance, prevalence of injury, risk factors for injury, clinical presentation and treatment for pathology. A systematic literature search was conducted using Medline/PubMed, CINAHL/EBSCO and Cochrane/Wiley databases/platforms using the following search terms: ligament, ligament teres, hip, femur, femoral head and round ligament. This search yielded 1284 articles of which 44 met the inclusion/exclusion criteria and contributed to their manuscript. Information on the LT was summarized into the following areas: anatomy, function, injury prevalence,

risk factors, mechanism of injury, duration of symptoms, clinical presentation (symptoms, range of motion, functional limitations, special testing), imaging and treatment. The results of this review supported the following: (i) the LT has a function in restraining hip rotation range of motion; (ii) the prevalence of LT pathology in any given population may be largely dependent on the severity of bony deformity (either FAI or dysplasia) and activity level; (iii) older age and acetabular bony deformity (either FAI or dysplasia) are risk factors for generalized LT pathology; (iv) unique signs and symptoms are difficult to identify because LT pathology rarely occurs in isolation and is likely the end-stage consequence of other hip pathology; (v) the presence of LT pathology may negatively affect an individual's ability to function; and (vi) the authors recommended surgical debridement for pain relief of partial LT tears with reconstruction possible for complete LT tears when complaints of instability were noted.

#### CONFLICT OF INTEREST STATEMENT

None declared.

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