



Fig. 1 (A) Supine arthroscopic view of left hip showing open capital femoral physis (arrows) in a 13-year-old boy treated with femoroplasty (and labral repair plus subspine decompression for malunion of anterior inferior iliac spine) in 2011. **(B)** Intraoperative fluoroscopic image of right hip during shelf acetabuloplasty with iliac crest graft (outlined in red) being positioned in supra-acetabular slot of a 47-year-old patient with moderate dysplasia. The image captures thin guidepin guiding bone graft into slot and drilling with cannulated drill over thicker guidepin for subsequent headless compression screw fixation. **(C)** Endoscopic view of pubic symphysis after pubic symphysectomy for recalcitrant osteitis pubis (arrowhead) and during repair of avulsed prepubic aponeurotic complex (*) in a 19-year-old wrestler with chronic central pubic pain.

Courtesy of Dean K. Matsuda, MD

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Clinical

Arthroscopy

Hip

Big Impact Items and Issues in Hip Arthroscopy

A 70-degree arthroscopic view of emerging advances

A lot has happened in the three years since the last AAOS Now update on the rapidly evolving field of hip arthroscopy and hip preservation.

Midterm studies have reported durable successful outcomes following arthroscopic treatment of femoroacetabular impingement (FAI). Three randomized, controlled trials (two from the United Kingdom and one from the United States) comparing physical therapy (PT) to hip arthroscopy for FAI reported divergent findings. Both U.K. studies reported significantly better outcomes in the surgical group but demonstrated improvement in both groups, suggesting that PT has clinical benefit. The U.S. study was limited to military recruits and found no significant difference in two-year outcomes between groups, but there was a 70 percent crossover of patients from PT to hip arthroscopy. The study, however, was an underpowered “as treated” analysis.

As acceptance of the value of hip arthroscopy grows, a study of case logs from American Board of Orthopaedic Surgery candidate surgeons, especially those with fellowship training in sports medicine or joint reconstruction, revealed that a growing number of surgeons are incorporating hip arthroscopy into their practices. Moreover, more of those surgeons are performing labral repairs compared to débridements. But learning-curve studies still confirm a formidable volume of 519 total cases and a minimum 60 cases per annum to reduce reoperation rates and major complications, respectively.

Evidence now supports the use of simultaneous bilateral hip arthroscopy as a safe and viable option for select patients with recalcitrant symptoms in both hips. More extreme deformities, including global pincer FAI (e.g., coxa profunda or acetabular

protrusio) and posterosuperior cam deformities, are amenable to arthroscopic treatment by experienced surgeons. Several outcome studies have supported arthroscopic treatment of coxa profunda, although less is known about protrusio. Furthermore, adolescents represent a growing segment of hip arthroscopy patients. In adolescents with cam FAI, arthroscopic femoroplasty appears to be safe without iatrogenic slipped capital femoral epiphyses and/or deformities from premature physeal closure (Fig. 1A).

Arthroscopic labral reconstruction now has midterm outcomes supporting its utility for segmental reconstruction. The newer total labral reconstruction has short-term outcomes supporting selective use. Labral augmentation (addition of labral graft with retained irreparable or insufficient labral tissue) has been reported to improve outcome scores compared to labral reconstruction. Allograft tissue (tibialis anterior, semitendinosus, and fascia lata) has become a popular graft option.

The debate over capsular closure continues. Although some studies have reported improved outcomes and others have demonstrated no difference, the emerging consensus appears to support capsular closure in hips with increased laxity or risk of anterior instability (e.g., borderline dysplasia, increased femoral anteversion), revision cases, and high-demand athletes. Moreover, there appears to be a trend toward smaller and/or more oblique capsulotomies, leaving more of the critical iliofemoral ligament intact, perhaps minimizing or obviating the possible benefit of capsular closure.

Borderline dysplasia is gaining acceptance as a reasonable indication for arthroscopic intervention as an isolated surgery and as an adjunctive procedure along with periacetabular osteotomy. In that setting, the typical arthroscopic approach includes labral preservation (via labral repair or partial

débridement of frayed but otherwise stable tissue) and femoroplasty of coexistent cam FAI along with capsular repair or plication. Popular in Japan, endoscopic shelf acetabuloplasty has been reported as a viable option in athletes (Fig. 1B) but has been slow to gain acceptance in the United States.

Hip spine syndrome, historically focused on the connection between spinal conditions and hip arthroplasty for arthritic hips, is a relatively new frontier in hip preservation. Spinal deformities or conditions associated with functional pelvic tilt or obliquity cause obligatory alterations in acetabular orientation, affecting femoroacetabular dynamics. In the decision-making algorithm for possible acetabuloplasty, femoroplasty, and periacetabular osteotomy, standing anterior-posterior pelvis radiographs may be more useful than supine images. Posterior hip pain may be generated from nonspine sources, such as ischiofemoral impingement (IFI), deep gluteal syndrome (extra-spinal sciatic entrapment), chronic proximal hamstring tendinopathy, and FAI.

A recent study found that 10 percent of patients with FAI had atypical posterior hip pain, and similar successful improvement was reported following arthroscopic FAI surgery.

Another study reported no compromise in successful outcomes following hip arthroscopy for FAI in patients with prior lumbar spine surgery, but another study showed poorer outcomes following gluteus medius repair in patients with spinal deformities.

Femoral version abnormalities are a hot topic in hip preservation. Retrotorsion may cause FAI, whereas increased antetorsion may cause anterior hip instability and extra-articular posterior impingement, such as IFI or greater trochanteric pelvic impingement. Closed derotational femoral osteotomy using an intramedullary saw is gaining popularity

and has been recently shown to provide clinical benefit in select patients.

What was once called trochanteric bursitis may better be called greater trochanteric pain syndrome, a spectrum of lateral-based pathology that culminates in rotator cuff tears of the hip, affecting primarily middle- to older-aged women. Endoscopic repair of torn gluteus medius and/or minimus tendons appears to provide similar successful outcomes to the open equivalent.

Patients with FAI may present with groin pain and more central pubic pain. Such patients may have coexistent osteitis pubis and/or athletic pubalgia, more recently called core muscle injury (CMI). A recent study demonstrated resolution of peri-symphyseal bone marrow edema following arthroscopic treatment of FAI in soccer players, suggesting a causal link between constrained hip range of motion from FAI and pathologic transfer stress to the pubic symphysis. Avulsion of the prepubic aponeurotic complex (PPAC) has been suggested as a pathologic finding in some of those patients. Endoscopic pubic symphysectomy, often performed concurrently with hip arthroscopy for patients afflicted with FAI, and endoscopic repairs of the PPAC (Fig. 1C) may provide less invasive alternatives to open symphyseal débridement and repairs.

Hip arthroscopic surgery continues to evolve, with expansion and refinement of indications and innovative techniques based on evidence-based studies. National and international collaborations are occurring between open and arthroscopic hip preservation surgeons, hip and spine surgeons, and hip and general surgeons specializing in CMI. The future looks bright despite many more questions to be answered.

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Several international colleagues chime in to the query, ‘What in your opinion is a big impact advance in hip arthroscopy and why?’

Richard Villar, of London, England: “Beyond microfracture, orthobiologics is expanding rapidly, with the sometime use of fibrin to repair chondral surfaces, or in conjunction with platelet-rich plasma or mesenchymal stem cells. Manmade membranes are also being used, either in isolation or as a carrier for orthobiologic techniques.”

Soshi Uchida, of Fukuoka, Japan: “In a series of 32 active patients undergoing endoscopic shelf acetabuloplasty (ESA), the mean patient-reported outcome (PRO) scores significantly improved from pre- to postoperatively. There was a 90 percent return-to-play rate, with a mean period of nine months. ESA can address athletes with developmental dysplasia with large acetabular bone cyst and rim stress fracture.”

Luis Perez-Carro, of Santander, Spain: “The concept of fibrous

bands playing a role in causing symptoms related to sciatic nerve entrapment in the deep gluteal space represents a radical change in the current diagnosis, understanding of the pathophysiological mechanisms, and therapeutic endoscopic approach for the all-inclusively used term ‘piriformis syndrome.’”

Ehud Rath, of Tel Aviv, Israel: “Rehabilitation protocols are changing, adjusting to new surgical techniques and accelerated recuperation. In vivo studies have shown that acetabular labral suture-anchor repairs can withstand the physiological loads of axial weight bearing. PRO measures and satisfactory rates with immediate weight bearing following hip arthroscopy for femoroacetabular impingement and labral tears do not differ significantly from results after strict nonweight-bearing rehabilitation protocols.”

Bruno Roos, of Passo Fundo, Brazil: “Recently, better understanding of slipped capital femoral epiphysis and the vascular supply of the proximal femur have led to new treatment options, such as arthroscopic subcapital osteotomies for moderate to severe cases, with the potential of modifying the natural history of the disease.”

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