

# Hip Arthroscopy With Initial Access to the Peripheral Compartment: A Detailed Step-by-Step Technique Description



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**Abstract:** Hip arthroscopy with initial access to the peripheral compartment represents a specific technique to approach the hip that can be particularly useful. This technique is suitable for both the arthroscopic treatment of femoroacetabular impingement syndrome and other pathologies that can be addressed by classic arthroscopy with central compartment initial access. Minimal capsulotomies preserve the fluid pressure in the peripheral compartment, which allows the “ballooning” of the capsule and improved joint exposure with decreased risk of fluid extravasation. In the vast majority of cases, the hip joint can be accessed by any technique depending on the surgeon preference/expertise. Interestingly, access to the central compartment under direct arthroscopic visualization decreases the risk of iatrogenic labral and chondral damage. This is particularly important when access to the central compartment is technically challenging (e.g., acetabular overcoverage, labral hypertrophy, and limited joint distraction). Such a technique is also preferable if the pathology is mainly located in the peripheral compartment. Despite several advantages, hip arthroscopy with initial access to the peripheral compartment is not a commonly performed technique. Our purpose is to perform a step-by-step explanation of a previously described technique.

**H**ip arthroscopy with initial access to the peripheral compartment (PC) was originally described by Dorfman and Boyer<sup>1</sup> in the treatment of synovial membrane disorders. Later, the initial access to the PC without traction was then extensively researched by Dienst et al.<sup>2,3</sup> and reported to be suitable for the arthroscopic treatment of femoroacetabular impingement (FAI)<sup>4-6</sup> and other pathologies that also can be addressed by arthroscopy with the classic central compartment (CC) initial access.

This technique allows for both (1) cam deformity correction with limited capsulotomies, thus preserving iliofemoral ligament function and (2) arthroscopically guided CC portal creation with decreased risk of chondral and labral iatrogenic injury. Furthermore, the PC initial access technique might be preferred in cases with technically difficult access to the CC (e.g., acetabular overcoverage, hypertrophic labrum, and limited joint distraction) or when the disease is mainly located in the PC.

Traditional interportal and “T” capsulotomies are useful for cam exposure and resection but have been reported to transect the iliofemoral ligament and predispose to hip instability. Interestingly, using the PC first approach technique, it is possible to use a “ballooning” technique for cam exposure and resection with minimal capsulotomies and capsular preservation. Despite all the aforementioned advantages, this technique is uncommonly performed in the clinical practice of most surgeons. Hence, we report on the concise description of the main technical steps, highlighting their specific added-value.

## Surgical Technique (With Video Illustration)

### Patient Position and Portals

We perform our routine technique with the patient in the supine position on a traction table or a dedicated

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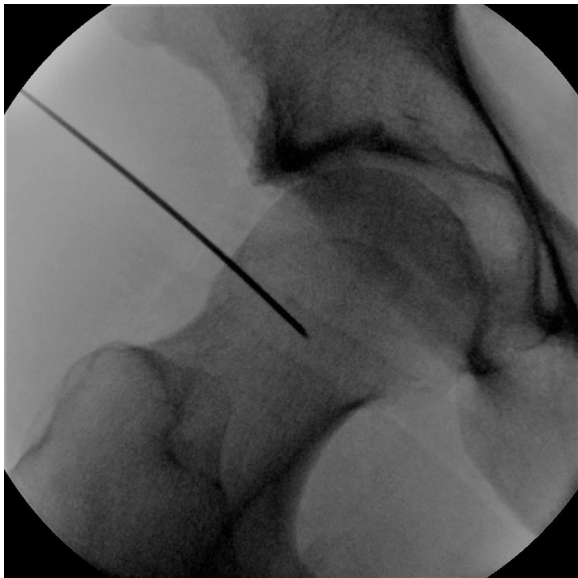
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table (Hip Positioning System; Smith & Nephew, Andover, MA) and a large, well-padded perineal post. Starting in the PC without traction as described by Dienst et al.,<sup>2,3</sup> a proximal anterolateral portal (PALP) is established under fluoroscopic control into the anterior femoral head–neck junction with the hip in 30° of flexion and 10° of abduction (Disposable Hip Pac; Smith & Nephew) (Fig 1 and Video 1). The PALP is used as the viewing portal in the PC (with an arthroscope with a 70° lens) and the anterior portal (AP) and anterolateral portal (ALP) are established under arthroscopic control and used as working portals. The AP should be placed proximal to the zona orbicularis at the 3-o'clock position of the femoral head. A more medial placement of this portal can compromise the access of surgical instruments to the lateral portion of the femoral neck.

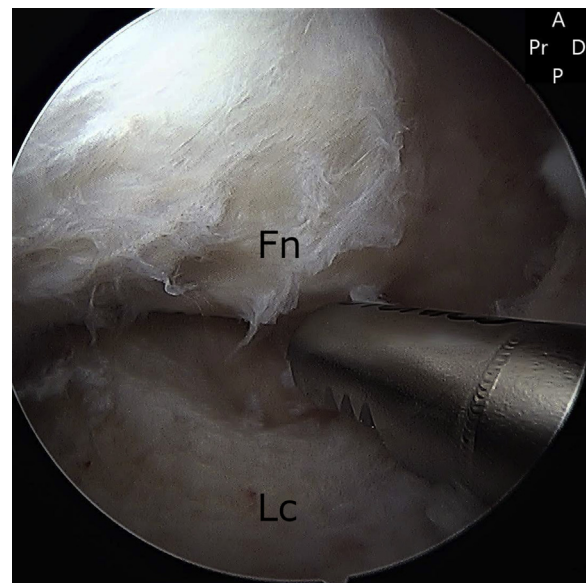
### Arthroscopy in the PC

To increase maneuverability of the instruments and improve visualization in the PC, we perform a synovectomy and a capsular thinning, particularly at the zona orbicularis, using a shaver and radiofrequency wand (shaver 4.5-mm-long Incisor Plus Elite Blade 180 mm and radiofrequency wand AMBIENT HipVac 50 IFS 4.7 mm 50° Suction; Smith & Nephew) (Fig 2). The portals are established with minimal capsulotomies to preserve fluid pressure, which allows the “ballooning” of the capsule and increased exposure in the PC.

In FAI cases, the femoral osteoplasty is initiated at the anteromedial margin of the femoral neck, with a burr (5.5-mm-long Abrader Burr; Smith & Nephew) with the hip in flexion and variable rotation depending on



**Fig 1.** Image intensifier picture of a right hip with the patient in supine position in a traction table. Starting at the proximal anterolateral portal, an arthroscopic needle is introduced to the anterior femoral head–neck junction under fluoroscopic control.



**Fig 2.** Peripheral compartment image of a right hip, viewing lateral and distal from the proximal anterolateral portal. A capsular thinning is performed with a shaver in the anterior portal. Minimal capsulotomies preserve fluid pressure to allow the “ballooning” of the capsule and increase cam exposure. (A, anterior; D, distal; Fn, femoral neck; Lc, lateral capsule, P, posterior; Pr, proximal.)

the areas that we need to access. The lateral cam is addressed with the hip in extension, the burr in the ALP, and a switching stick in the AP to push the capsule laterally (Fig 3). Larger posterolateral cam deformities might require traction to increase exposure proximally. Arthroscopic impingement test and fluoroscopy is used to confirm adequate cam correction intraoperatively.

### Access to the CC

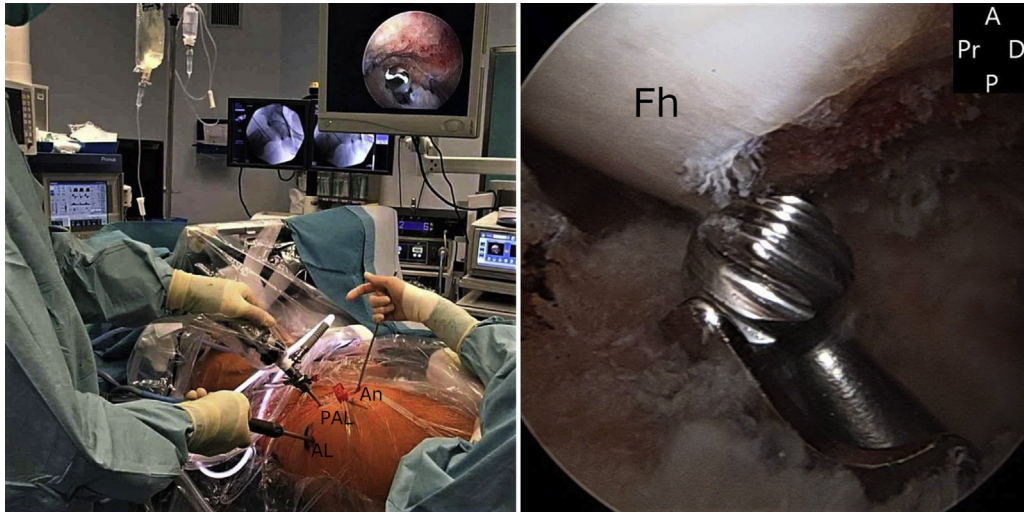
To establish access to CC, the least possible amount of traction is used. Under direct arthroscopic visualization (PALP) and while using the switching stick (AP) to push the lateral capsule, CC access is atraumatically established from the ALP (Fig 4).

Usually in cases of labral hypertrophy, the access to the CC can be challenging and with an increased risk of iatrogenic labral injury. Using this technique with direct visualization from the PC, it is possible to enter the CC under the labrum, hence avoiding iatrogenesis (Fig 5).

In addition, acetabular overcoverage may also limit the path to the CC, although it is possible to perform rim trimming from the PC without traction, thus increasing joint space and permitting safe access to the CC (Fig 6). In the CC, both viewing and working portals are alternated for enhanced exposure and access. At this stage, the acetabular rim, cartilage, and labrum lesions can be addressed in a similar way as in the classic technique of CC first access.

At the end of the procedure, traction is released, and the access to the PC is re-established as during the





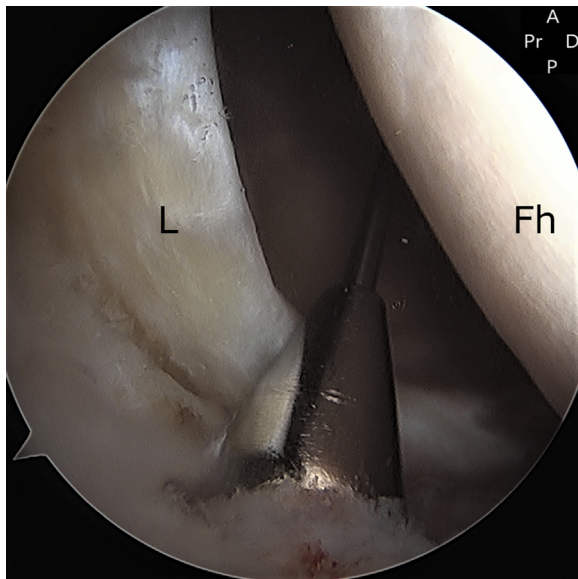
**Fig 3.** Portals, instruments positions, and arthroscopy image of a right hip viewing lateral and proximal from the proximal anterolateral portal. Lateral femoral osteoplasty is done with the hip in extension, the burr in the anterolateral portal, and a switching stick in the anterior portal to push the capsule laterally. Traction is used to displace the femoral head from the labrum when proximal osteoplasty is needed. (A, anterior; AL, anterolateral portal; An, anterior portal; D, distal; Fh, femoral head; P, posterior; PAL, proximal anterolateral portal; Pr, proximal.)

initiation of the surgery. It is possible to evaluate the labrum repair from PC, the suction seal, and capsular status. Using the PALP as a viewing portal, the capsule can be repaired with resorbable sutures using a fine suture management device (ACCU-PASS DIRECT; Smith & Nephew) and an arthroscopic canula (CLEAR-TRAC 8.5 × 110 mm; Smith & Nephew) in the mid anterior portal (Fig 7).

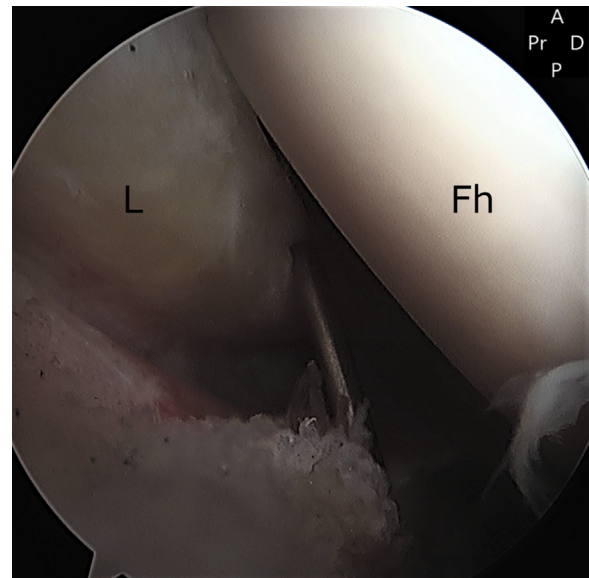
## Discussion

Hip arthroscopy with initial access to the PC allows an adequate and safe joint assessment and is an intra-articular technique and not extra-articular like the “outside-in” approach.<sup>7</sup> It represents an alternative procedure compared with the more classically used CC first access (Table 1).

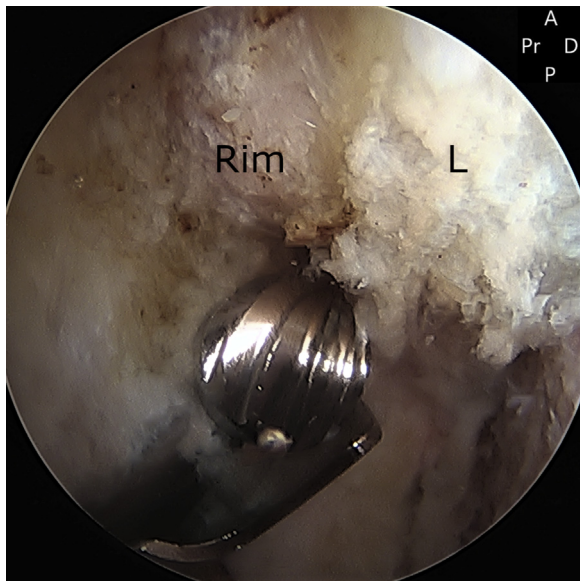
In the vast majority of cases, the hip joint can be accessed by both techniques depending on the surgeon



**Fig 4.** Right hip, viewing lateral and proximal from the proximal anterolateral portal. Using the switching stick in the anterior portal to push the lateral capsule, central compartment access is established from the anterolateral portal. (A, anterior; D, distal; Fh, femoral head; L, labrum; P, posterior; Pr, proximal.)



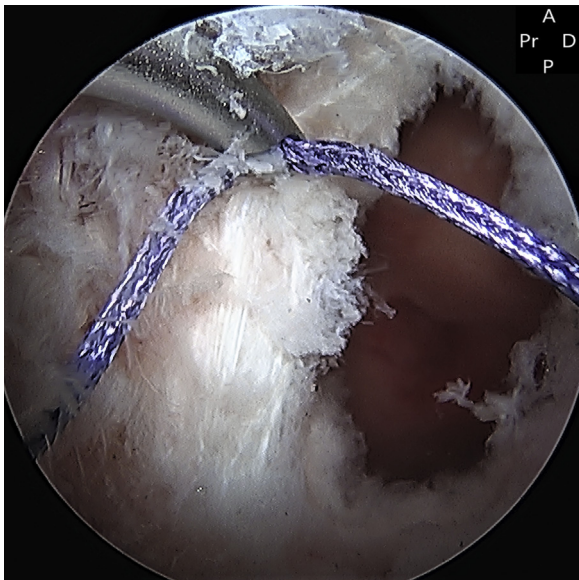
**Fig 5.** Right hip, viewing lateral and proximal from the proximal anterolateral portal. From the anterolateral portal an arthroscopic needle is introduced into the central compartment underneath the hypertrophic labrum. (A, anterior; D, distal; Fh, femoral head; L, labrum; P, posterior; Pr, proximal.)



**Fig 6.** Right hip, viewing lateral and proximal from the proximal anterolateral portal. Acetabular osteoplasty is performed in the peripheral compartment with the burr in the anterolateral portal to increase the clearance for the central compartment access. (A, anterior; D, distal; L, labrum; P, posterior; Pr, proximal; Rim, acetabular rim.)

preference. The visualization and procedures performed in the CC are also similar in both arthroscopic approaches.

Despite several advantages, hip arthroscopy with initial access to the PC is not a very popular technique, probably due to the few publications reporting its use



**Fig 7.** Right hip, extra-articular aspect of the capsular defect, viewing from the proximal anterolateral portal. The capsule can be repaired with sutures using a suture-management device plus an arthroscopic canula in the mid-anterior portal. (A, anterior; D, distal; P, posterior; Pr, proximal.)

**Table 1.** Key Points

Access the PC without traction under fluoroscopic control into the anterior head–neck junction
AP and ALP established under arthroscopic control
Minimal capsulotomies to preserve the fluid pressure, which allows the “ballooning” of the capsule and increased exposure in the PC
Capsular thinning, particularly at the zona orbicularis and lateral capsule, facilitates the arthroscopic visualization in the PC and the CC access
Lateral cam is addressed with the burr in the ALP and a switching stick in the AP to push the capsule laterally
Access to CC under direct arthroscopic vision
Evaluate the capsular status from PC at the end of the procedure and repair with sutures if necessary

ALP, anterolateral portal; AP, anterior portal; CC, central compartment; PC, peripheral compartment.

and the fact that most of the surgeons are not very familiar with it.

The first portal (PALP) is directed to the anterior femoral head–neck junction under fluoroscopic control with less risk of iatrogenic chondral damage of the femoral head. If anterior neck scuffing occurs, it usually corresponds to the area that will be subject to osteoplasty.

PC initial access may be particularly preferred in cases of difficult access to the CC (e.g., significant acetabular overcoverage, limited joint distraction, labrum hypertrophy) and if pathology is mainly located in the PC (Table 2).

Minimal capsulotomies, capsular thinning, and the capsular-ballooning technique allow an excellent exposure of the PC without compromising hip stability and decrease the fluid extravasation associated to a wide capsulotomy (T capsulotomy). In the capsular preparation, care is taken to avoid a full-thickness capsular defect, which would compromise capsular expansion and visualization in the PC. Although capsular incisions are small,

**Table 2.** Pearls and Pitfalls

<b>Pearls</b>
Minimal capsulotomies and capsular preservation
Increase exposure in the PC
Decrease fluid extravasation
Less risk of instability
Initial portals established without traction
Less traction time
Access to CC under direct arthroscopic vision
Decreases the risk of iatrogenic labral and chondral damage
Important when access to the CC is difficult
Acetabular osteoplasty can be performed from the PC without traction
Technique is preferable if the pathology is located mainly in the PC
<b>Pitfalls</b>
Needs an additional viewing portal for PC
Capsular preparation and synovectomy are necessary in the PC
Location of the AP—risk of lateral cutaneous nerve injury
Pattern of chondral damage is only accessed in the CC

AP, anterior portal; CC, central compartment; PC, peripheral compartment.



**Table 3.** Advantages and Limitations

Advantages
Minimal capsulotomies
Capsular preservation
CC access under direct arthroscopic control
Limitations
Less-popular approach
Studies based on the experience of a limited number of surgeons
Impossible to inspect the chondrolabral junction from the PC without traction

CC, central compartment; PC, peripheral compartment.

some capsular preparation and synovectomy is necessary in the PC to expose the lateral femoral head–neck junction and to visualize the space between the femoral head and the labrum for CC access. Due to this capsular conservative approach, the capsule can be repaired only in patients with increased risk of instability, although we recommend the routine assessment of capsular integrity at the end of the procedure from the PC.

Considering that the initial portals were established without traction, this conceptually reduces the total amount of traction time, particularly during the early learning curve of hip arthroscopy.<sup>6</sup>

The skin incision for the AP is established slightly lateral to decrease the risk of lateral femoral cutaneous nerve injury.

In FAI cases, the cam is corrected in the PC and an arthroscopic impingement test is performed with progressive hip flexion and rotations. In borderline cases, this can be used to define whether acetabular rim trimming is necessary after cam correction.

In addition, the intra-articular approach to the PC releases the intracapsular negative pressure, therefore decreasing the traction force required for adequate joint distraction. Similarly, in the PC without traction, it is possible to evaluate labral stability and function, although chondral pathology is usually observed in the CC under traction.<sup>8</sup> This might be considered a disadvantage of the technique because the pattern of chondral damage is only accessed in the CC and usually after the cam correction.

Moreover, access to CC under direct arthroscopic visualization decreases the risk of iatrogenic labral and chondral damage.<sup>6</sup> This is especially important in situations of difficult access to the CC (acetabular over-coverage, labral hypertrophy, and limited joint distraction). In particular cases in which the entry to the CC is blocked (capsular ossification or osteochondromas in the PC), only the correction of these obstacles in the PC permits CC access.

This hip arthroscopy approach is versatile and can be used in other hip pathologies such as synovial membrane disorders, intra-articular osteochondromas, and

after traumatic hip dislocation.<sup>9,10</sup> It is also preferable if the pathology is mainly located in the PC, as it allows an excellent visualization and maneuverability in the PC without wide capsulotomies (Table 3).

This technique also has potential advantages compared with the outside-in extra capsular approaches, which involves a wide capsulotomy.<sup>7</sup> Although capsular repair is possible provided that tissue integrity is maintained, it is still challenging to re-establish the original biomechanical properties of the capsule.

### Limitations and Future Perspectives

There are only few studies with this technique based on the experience of a limited number of surgeons and no large investigation comparing it with the CC initial approach. Future research to compare available techniques, namely regarding safety, compared efficacy, complications, cost-effectiveness, and outcomes, is important to establish the advantages of each one.

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