



Postless Hip Arthroscopy: A Safer Alternative for Treatment of Femoroacetabular Impingement Syndrome

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Background: Hip arthroscopy for femoroacetabular impingement (FAI) syndrome continues to gain popularity and indications for its use are expanding. Though low complication rates have previously been reported, there are iatrogenic complications specific to the use of the perineal post, such as pudendal nerve injuries, and possible pressure skin necrosis that warrant concern in the healthy young patient. The risk of these complications are increased during simultaneous bilateral hip arthroscopy.

Indications: We describe a new technique, which will prevent such problems by using a postless pink pad technique in order to achieve adequate hip distraction.

Technique Description: Arthroscopic investigation begins with proper, safe patient positioning in order to gain access to the hip joint with sufficient joint distraction. In the postless technique, a dense foam pad is utilized in lieu of a perineal post. The static friction between the pad, bed, and the patient counters the manual gross traction necessary to distract the hip joint while preventing the patient from sliding down or off of the operating table. The postless technique avoids pressure to the perineum and also allows for greater range of motion during dynamic intraoperative examination and femoroplasty. After hip distraction, standard portal placement allows for access to the central compartment in order to assess intraarticular pathology. Once identified on diagnostic arthroscopy, appropriate techniques are utilized to correct acetabular-sided pincer lesions, labral tears, and femoral-sided cam deformities.

Results: When discussing this technique with patients, it is important to highlight that it diminishes the possibility of iatrogenic pressure injury to the pudendal nerve and skin of the perineum. The risk of these injuries typically occurs when the pudendal nerve is compressed against the post during traction and abduction. As such, postless technique prevents any compression and pressure to these regions.

Discussion/Conclusion: Hip arthroscopy is a minimally invasive, low morbidity technique for treating a variety of chondral, ligamentous, and bony conditions of the hip. However, studies suggest that pudendal nerve injury is seen in up to 4.3% of patients following hip arthroscopy. Given avoidance of iatrogenic post complications, we describe a postless technique for achieving hip distraction during hip arthroscopy.

Keywords: hip arthroscopy; FAI; hip distraction; surgical techniques

VIDEO TRANSCRIPT

Patient is a 19-year-old female dancer with almost 3 years of anterior bilateral hip pain. The pain was present not only with dancing but also activities of daily living, and her nonoperative care consisted of rest, activity modification, anti-inflammatories, and physical therapy working on core lower back strengthening. Plain radiographs

show no fractures or dislocation. There are no signs of hip dysplasia.

[Diagnostic injections provided about 75% pain relief according to the patient. During her nonoperative treatment, she began to develop compensatory posterior thigh pain and bilateral knee pain. Rheumatologic workup was negative.]

On examination, she exhibits anterior impingement signs, as well as a positive labral stress test. Range of motion is 140° of flexion, 30° of internal rotation, and 80° of external rotation. X-rays show a pincer lesion and cam deformity. No fracture or dislocation. Computed tomography (CT) 3D reconstruction demonstrates these

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deformities more clearly. CT also demonstrates that this patient has 11° of acetabular retroversion. Magnetic resonance imaging (MRI) shows an anterior superior labral tear. In terms of our hip distraction techniques, we do have available the postless technique, which helps utilize gravity and the friction between the patient's skin and a dense foam pad. This helps counter the gross traction while pulling on the leg. This helps to avoid iatrogenic post complications, including a pudendal nerve palsy as well as soft tissue injury. Also, it allows for greater range of motion during the intraoperative dynamic examination. Our second technique utilizes the perineal post, which helps to counter the gross traction while pulling on the leg for hip distraction. Pudendal nerve injuries have been found to be present 4% of the time with also the possibility of soft tissue damage to the scrotal and labial areas.

We will review proper technique of achieving postless hip distraction using a pink foam pad. Arthroscopic investigation begins with proper, safe patient positioning in order to gain access to the hip joint with sufficient hip distraction. In the postless technique, a dense foam pad is utilized in lieu of a perineal post. The static friction between the pink pad, the bed, and the patient counters the manual gross traction necessary to distract the hip joint. Additionally, the weight of the patient creates static friction between the patient, pad, and bed that prevents the patient from sliding down or off of the operating table. The postless technique avoids pressure to the perineum and also allows for greater range of motion during dynamic intraoperative examination and femoroplasty. After hip distraction, standard portal placement allows for access to the central compartment in order to assess intraarticular pathology. Once identified on diagnostic arthroscopy, appropriate techniques are utilized to correct both acetabular sided pincher lesions, labral tears, and femoral sided cam deformities.

The operating table is flipped so the head of the bed is where the patient's feet rest. The pink pad is placed on the bed with it perfectly lining up with the end of the bed. The "T" shaped part is placed where the feet of the patient will be. You can see here the pelvic hole where the post would be placed; however, this is not necessary with the pink postless technique. Here you can visualize the memory of the foam demonstrated by indenting it with pressure. The pad produces static friction between the bed, pad, and patient. A draw sheet is placed over the center of the pink pad to help allow for transfer of the patient once intubated and ready for positioning. The pink pad is first secured distally with a strap that passes underneath the bed. Next, the pad is secured to bed the rails with Velcro straps, with the excess being folded up to avoid it becoming tangled during the procedure. A soft

purple seat belt is attached to the railing of the bed to add one more element of safety to prevent the patient from sliding off the bed.

The leg extensions are placed into slots at the distal end of the bed and tightened to ensure a secure fit. The pelvic pad is then placed to help extend the bed to allow the patient to lie on the bed comfortable during induction. The boots are then prepared. It is critical to loosen all of the straps to ensure adequate fitting of the boot once the patient is ready to be positioned. The Achilles heel pad should be placed in the proper position to allow correct fitting of the boot. Lastly, the protective foam boots are then cut on the side that does not have Velcro to prevent unwanted skin pressure.

The patient is transferred to the operating bed and undergoes general anesthesia. Full paralysis is necessary to aid in adequate hip distraction. Mean arterial pressures in the 50s to 60s, if medically appropriate and safe, are recommended to control capsular bleeding at the beginning of the case to ensure optimal visualization. Epinephrine is also placed into the bags for the pump to help with bleeding. Patient is also given a preoperative dose of tranexamic acid (10 mg/kg with 1 gram max). After induction and when the endotracheal tube is secured, the patient is placed into the foam boots. It is important that the heel is seated at the back of the boot to ensure proper padding and positioning. The 3 Velcro straps are tightened to secure the foot into the boot. Next, the draw sheet is used to lift the patient vertically above the bed to move the patient to the correct position. It is critical to not slide the patient against the foam as this can cause rips and tears in the pink foam that may prevent proper distraction and can allow the patient to slide on the operating bed. *[The optimal position is to have the patient anterior superior iliac spines (ASIS) positioning at the end of the bed and foam. The draw sheet should be removed to prevent excess pressure on the skin.]*

Next, the patient's feet are strapped into the distraction boots. When placing the foot in the boot, the heel should be seated all the way to the back of the boot, with the Achilles pad just proximal to the insertion of the Achilles onto the calcaneus. The boot is then tightened using the middle strap first. The proximal and distal strap are then tightened as much as possible. Next, the patient's ipsilateral arm is draped across her body and tapped in an "X" fashion with 2 pieces of silk tape. This allows for working room on the operative side. Bony prominences are padded with foam and the elbow and shoulder are ensured to be in safe position.

In preparation for hip distraction, the contralateral leg is slightly abducted about 30° to 40° and gentle traction

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Bracketed and italicized text indicates information not included in the video narration.

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is applied to provide counter traction to the operative side. C-arm is positioned and x-ray confirms optimal visualization of the hip joint. Using fluoroscopic guidance, an air arthrogram is performed to break the negative pressure inside the hip joint to aid with distraction. X-ray shows that the suction seal has been broken. Next, gross traction is applied. Here you can see that friction of the pink pad does not allow for the patient to slide at all. Fine traction is applied, generally 20 to 30 turns. X-ray demonstrates adequate hip distraction to ensure working room for instrumentation. A piece of tape is then used to mark the site of traction. Fine traction is then released to maximize the available working traction time to avoid iatrogenic neuropraxia. X-ray is taken to ensure reduction of the hip.

The skin is washed with chlorhexidine soap and then dried with sterile towels. Next, 2 chloroprep sticks are used to further sterilize the operative field. A mayo stand is placed over the patient's face well above the endotracheal tube to allow for working space and a place to keep instruments. A half sheet is placed over the mayo stand. A second half sheet is placed over the patient's leg. Next, a shower curtain with ioband is placed centered over the hip joint. This is then draped over the rest of the patient's body. Instruments are then connected and placed on the sterile mayo stand.

After time out is performed the hip is placed back in traction to the tape mark. The hip is then injected under fluoroscopic guidance with saline solution through the anterolateral portal. A nitinol wire is threaded through the needle and confirm to be in the joint using fluoroscopy. The wire is pulled back 3 cm to prevent wire from abutting fovea during cannula insertion. The skin is incised the cannula is placed over the wire. A 70° arthroscopic camera is inserted through the trocar.

Under arthroscopic visualization, a spinal needle is placed to establish the anterior portal. Here on the right side of the screen you can see the chondrolabral junction to the left, the femoral head to the right, with the spinal needle entering through the capsular space in-between.

The anterior-superior labrum is identified and then using a combination of flexible cautery and rigid cautery the superior labrum is debrided from the acetabulum. A labral elevator may be used to assist in this. The distal anterior lateral accessory (DALA) portal is established using a spinal needle and the anchor deployment sleeve is placed through the portal. Once the optimal positioning is achieved with the anchor deployment sleeve in the superior acetabulum the position is checked using fluoroscopy. It is important to ensure correct trajectory to avoid drilling through the subchondral bone into the articular cartilage of the acetabulum.

For the first most anterior anchor, after drilling is performed a nitinol wire is placed into the drill hole and checked with fluoroscopy to ensure a firm end point with solid contact. The anchor is then deployed into the drill hole. The 2 limbs the suture are then identified and the limb closest to the labrum is grasped. This suture is placed behind the labrum through the chondrolabral junction exiting through the articular surface and then brought around. The 2 suture limbs are then tied with a Tennessee


sliding knot. As the knot is brought into the joint, the knot is directed toward the anchor hole to be away from the articular cartilage. This knot is followed by 3 half hitches. This process is repeated 2 to 4 more times depending on size and characteristics of labral tear. The joint is inspected one last time and the hip is taken off of traction. In this patient, 5 suture anchors were utilized.

The hip is taken off of traction and slightly flexed to 35° to 40°. This is where the postless technique is advantageous, because normally the post would have to be removed at this time to dynamically range the hip. Next, a burr is used to smooth out the cam lesion. Fluoroscopy is used while the hip is dynamically ranged in various positions to ensure smooth contour of the head-neck junction. Here are the x-rays from pre- and post resection of the CAM lesion.

Postoperative care is standardized for all of our patients. The patients are discharged home on the same day of surgery. *[Physical therapy begins on postoperative day 1.]* When utilized effectively, the postless pink foam technique can be very beneficial to hip arthroscopists. Here are tips and pearls that can be utilized to lead to successful postless hip distraction.

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