Hip arthroscopy is being used with increasing frequency as the understanding of arthroscopic management of groin pain improves. To access the hip joint arthroscopically, traction must be placed on the leg. In most cases, countertraction is provided with a padded post in the groin. Complications of traction are often attributed to the post and include perineal or pudendal neuropraxias and skin complications.

The purpose of this study was to investigate the safety of a traction technique that avoids a perineal post. A supine position is used with the foot in a standard traction boot. The patient is moved down the table such that his or her perineum is located 7 to 10 cm proximal to the traction post. The post is also located 5 to 10 cm lateral to midline. The operative table is placed in 15° to 20° of Trendelenburg. With this position, enough friction is generated between the patient’s upper body and bed to allow successful hip distraction without the post contacting with the perineum. One hundred seventy patients (111 men and 59 women) were followed prospectively and evaluated for possible side effects of this traction technique immediately postoperatively and 1 and 14 days and 3 and 6 months postoperatively. Patients were examined at each visit. No significant complications related to traction occurred during follow-up.

The described technique has been used in more than 2000 hip arthroscopies without a documented groin or perineal complication. It allows easy positioning and access to the central compartment.
Hip arthroscopy is a surgical tool increasing in popularity as the understanding of hip disability in the young athletic population grows. The diagnostic and therapeutic uses are numerous and most commonly directed at intra-articular cartilage and labral pathology. The orthopedic literature reports an acceptable incidence of complications, usually below 1.5%, but higher rates have been reported.1-7 The most common reported complications in hip arthroscopy include those related to traction, fluid management, bony complications, and surgical instruments.2,4,6,8,9

To access the central hip compartment, traction must be placed on the patient’s operative leg to allow joint distraction and entry of the surgical instruments. Hip arthroscopy can be performed in the supine or lateral position, typically with the leg in a boot and a padded post in the groin to act as countertraction. Complications related to traction are relatively common and are often related to the pressure of the post on the groin. One study reported 20 neuropraxias in a series of 1000 patients; 14 of the neuropraxias involved the perineal or pudendal nerves.5 Byrd6 reported a complication rate of 1.34% after 1491 hip arthroscopies, including 6 pudendal neuropraxias and 1 case of scrotal necrosis. The literature demonstrates that although complications are rare, they are commonly due to the traction post pressure in the perineum.

To attempt to eliminate skin, deep soft tissue, and neurological injuries to the groin during hip arthroscopy, the senior author (D.A.Y.) developed a traction method without the use of a perineal post 20 years ago and has used it in more than 2000 arthroscopies, with no groin or perineal complications reported. This technique is currently used by all of the authors at their respective institutions.

The purpose of this study was to prospectively assess the safety of this technique. The hypothesis, based on long-term experience, was that no side effects or complications would occur using the described technique.

**MATERIALS AND METHODS**

This study was approved by the institutional review board before the start of data collection and documentation. All patients presenting with painful natural or resurfaced hips and scheduled for hip arthroscopy were eligible for enrollment. A total of 170 consecutive patients undergoing hip arthroscopy for various indications were enrolled. No patients were excluded from the study cohort. The procedures were performed by 2 authors (O.M.-D., D.A.Y.) at their respective clinics.

Each patient was questioned regarding perineal and inner thigh skin, deep soft tissue, and neurological side effects. An evaluation was performed at the completion of surgery and then after the patient awoke and was able to cooperate and report on his or her physical status. The majority of patients (152/170) stayed overnight and were discharged the following day after an additional examination. They were asked specifically about perineal and inner thigh pain.

All patients were followed up 7 to 14 days postoperatively. History and physical examination focused on potential side effects, including traction side effects. Patients were then followed up at 3, 6, and 12 months postoperatively.

**SURGICAL TECHNIQUE**

Hip arthroscopy is performed with the patient in the supine position on a traction table and bony prominences of the foot and ankle well padded. The authors use a Denyer manual table (XRT3000 manual operating table, OE/1059 traction frame; Denyer Int, Victoria, Australia) with an on-floor traction frame (D.A.Y.) or the Skytron Elite 6500 table (Skytron, Grand Rapids, Michigan) with traction arms (MAXI traction accessory; Smith & Nephew, Andover, Massachusetts) (O.M.-D.), but virtually any traction table would work with the described technique.

The patient is moved down the table such that the perineum is located 7 to 10 cm proximal to the location of the traction post (Figures 1A, B). The radiolucent post (Figure 1C) should also sit 5 to 10 cm off center toward the operative side (Figures 1D-F). The operative limb is placed in a standard traction boot with a well-padded narrow post placed between the patient’s legs (Figure 1B). Instead of a wide-diameter hip arthroscopy post, a standard post commonly used for hip or femur fractures is used.

Once the setup is complete, the operative table is placed in approximately 15° to 20° of Trendelenburg (upper body tilted down) (Figure 1D). The limb is adjusted after Trendelenburg is established to ensure that the operative limb is positioned in 0° to 5° of flexion and abduction, relative to the pelvis. Fifteen degrees of hip internal rotation is applied (measured at the foot), bringing the femoral neck to 0° of version to allow for optimal portal placement. The nonoperative limb is placed in 30° to 40° of abduction, slight flexion, and external rotation to allow space for the fluoroscopy unit to obtain lateral images of the hip while maintaining minimal stress on the nonoperative limb. Using this technique, with the patient in 15° to 20° of Trendelenburg, enough resistance is created by gravity and friction between the patient’s upper body and the bed to allow for successful hip distraction without the post coming into contact with the perineum.

When positioning is complete, the leg is prepped in a standard sterile fashion for hip arthroscopy. A needle is inserted into the hip with the aid of fluoroscopy to break the suction seal of the hip joint and allow distraction. Traction is gradually placed on the operative limb. The post sits at the medial aspect of the patient’s proximal thigh but will remain 3 to 8 cm away from the groin, depending on the amount of traction applied and patient’s morphology. During the application of traction and intraoperatively, the surgeon can monitor with his hand the space between the post and the
patient’s perineum, making sure no contact occurs. A clear plastic drape is used to allow the surgical team to note any movement in the patient’s position that may put skin or perineal tissues at risk. The surgeon can access the space between the perineum and post to ensure a fist-sized gap remains throughout the case.

When surgery is complete in the central compartment and traction is no longer needed, the bed is taken out of Trendelenburg and put back to a horizontal position. Repositioning the table to flat from Trendelenburg functionally lowers the hip relative to the surgeon so the table is elevated to the previous working height, and peripheral compartment work is performed with the bed flat.

RESULTS
Between 2011 and 2012, a total of 170 patients (111 men and 59 women) were enrolled in the study. Mean patient age was 34 years (range, 16-66 years). Mean weight was 76 kg (range, 57-106 kg), and mean height was 175 cm (range, 155-190 cm). Seven patients had an artificial joint (resurfacing or total hip arthroplasty). One patient had both hips operated on during 1 surgery while under the same anesthetic. No perineal or thigh-related complications were observed at any patient follow-up examination.

DISCUSSION
To address intra-articular hip disease arthroscopically, traction must be applied to the lower extremity. Hip arthroscopy can be performed in the supine or lateral position, but all techniques for providing traction on the leg rely on the use of a post in the perineum to act as countertraction (Figure 2). The described technique involves no special equipment and takes no longer to set up than standard supine hip arthroscopy. It allows for safer access to the central hip compartment by decreasing the likelihood of injury to the delicate tissues of the perineum. Also, using this technique, the surgeon can be less concerned with traction time because no direct compression is being applied on any body organs, nerves, or vessels.

The majority of complications due to hip arthroscopy are preventable and are usually related to patient positioning or fluid management. In a series of 1491 patients, a complication rate of 1.34% was reported. Of the 20 complications documented, 7 were likely related to traction against the perineal post, including 6 temporary pudendal nerve palsies and 1 case of scrotal necrosis. Clarke and Villar reported 15 (1.4%) complications in a series of 1054 hip arthroscopies. The likely traction-related complications included temporary neuropraxias involving the femoral and sciatic nerves and a vaginal tear. In another study, Sampson reported a consecutive series of 1000 patients treated with hip arthroscopy. Of the 20 neuropraxias reported, 10 involved the perineal nerve and 4 involved the pudendal nerve. The study reported no skin complications.

Complications related to the use of a perineal post are not limited to the hip

Figure 1: Photograph showing the patient positioned in 15° of Trendelenburg with the foot in a well-padded boot (A). The post is located 10 cm from the perineum (dotted line) and off-center such that it rests against the proximal medial thigh (B). Photograph showing the radiolucent perineal post prior to being wrapped with soft roll (C). Position of the post off-center using the authors’ preferred tables: the manual table with on-floor traction frame (XRT3000 manual operating table, OE1059 traction frame; Denyer Int, Victoria, Australia) (A-C, F) or the Skytron elite 6500 table (Skytron, Grand Rapids, Michigan) with traction arms (MAXI traction accessory, Smith & Nephew, Andover, Massachusetts) (D, E).
arthroscopy literature. At least 2 reports have described pudendal nerve palsies after intramedullary nailing of the fractured femur.13,14 In 1 study, the authors reported that the amount of traction force used during nailing correlated significantly with the likelihood of pudendal nerve palsy.13 Other authors have described hip distraction for arthroscopy without a perineal post. Flecher et al15 described a traction technique involving external fixation. They used a specifically designed distractor using a total of 4 pins, 2 placed in the acetabulum and 2 placed in the proximal femur, which allowed for up to 50 kg of distraction force. They reported no traction-related complications, but the technique has several disadvantages. The need to make more incisions and to drill into the femur and pelvis are drawbacks for the patient in terms of early pain scores and cosmesis and potentially place the patient at risk for iatrogenic stress riser–related fracture. Furthermore, the use of disposable traction pins increases cost and operative time; the authors required an average of 18 minutes to insert the distraction pins.15 Merrel et al16 described a technique in which the patient is positioned supine with a positioning beanbag placed circumferentially around the chest and upper abdomen. This construct is then taped to the bed, allowing distraction. They reported no issues with distraction or access in 30 patients.16

Contrary to the aforementioned techniques, the current technique requires no additional surgical instrumentation, additional skin cuts, compromising of soft tissues, or bone drilling. It also has the advantage of not limiting access or constraining the abdomen or thorax. The setup time is shorter, with no extra equipment or preparation needed, such as using a beanbag or taping of the patient. Concern may be raised regarding positioning a patient in the Trendelenburg position once surgery is complete in the central compartment and work in the peripheral compartment begins.

The senior author observed a single minor complication using this technique prior to the initiation of the current study. The patient sustained a medial thigh skin rash postoperatively because the surgeon did not wrap the post with a soft roll, resulting in skin irritation due to contact with the post’s outer rubber surface.

With the current technique, no increased difficulty with access to the hip joint exists because distraction is not an issue. Positioning is quick and easy and requires no special equipment. In theory, distraction without a post should eliminate perineal pressure–related complications to the pudendal and perineal nerves, as well as the delicate tissues of the perineum.10

REFERENCES


