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Hip Arthroscopy by the Lateral Approach

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Summary: This report describes a new technique by which arthroscopy of the hip provides complete visualization of the joint space. The arthroscope and operative instruments are inserted by a direct lateral approach over the greater trochanter, with the patient in the lateral decubitus position. The involved leg is held in an abducted and flexed position with traction by pulleys hung overhead. Hip abduction and flexion relaxes the capsule and traction separates the joint so that insertion of the arthroscope is facilitated. Arthroscopic examination of the hip joint was performed in 11 patients. The indications for surgery included diagnosis of unresolved hip pain following failure of conservative treatment, removal of loose bodies, exploration and debridement following fracture and/or dislocation, and evaluation of the arthritic hip prior to definitive surgery. **Key Words:** Hip joint—Lateral approach—Abduction—Relaxed capsule—Pain—Loose bodies.

*[**Editor's comments:** The frontiers in arthroscopy have not yet been reached, as is evidenced by this fine manuscript by Dr. James M. Glick et al., on arthroscopy of the hip. Like so many new arthroscopic surgical procedures, this one is technically difficult, fraught with some danger, and should be attempted by only the most experienced arthroscopic surgeon.]*

Advances in technique and instrumentation have resulted in an expansion in the clinical application of arthroscopy to include many joints other than the knee. To date, these have included the ankle, hip, shoulder, elbow, wrist, finger, and temporomandibular joints (1–3). Of the large joints, perhaps the least attention has been given to arthroscopic surgery of the hip. This was due in part to the difficulty of adequately visualizing the entire hip joint, especially posteriorly, using the recommended anterior approach (1–8). In fact, it was the inability to remove several posteroinferior loose bodies that prompted us to develp a direct lateral approach, borrowing from the commonly used lateral approach for total hip arthroplasty (9) (Fig. 1). This article describes the lateral approach for arthroscopy of the hip and presents our preliminary experience using the technique.

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MATERIALS AND METHODS

Between February 1985 and August 1986, 12 hips in 11 patients were arthroscoped by the lateral approach, using a standard 5-mm arthroscope. Nine patients were women and two men. The age range of the patients was 23–66. Five arthroscopies were performed on the right hip and seven on the left hip. One patient had 2 arthroscopic debridements, a year apart. Surgical indications included posttraumatic pain, loose bodies, arthritic pain, pain secondary to avascular necrosis, and unresolved pain following several months of conservative treatment (Table 1).

Operative technique

Using general anesthesia, position the patient in the lateral decubitus position, with the operative

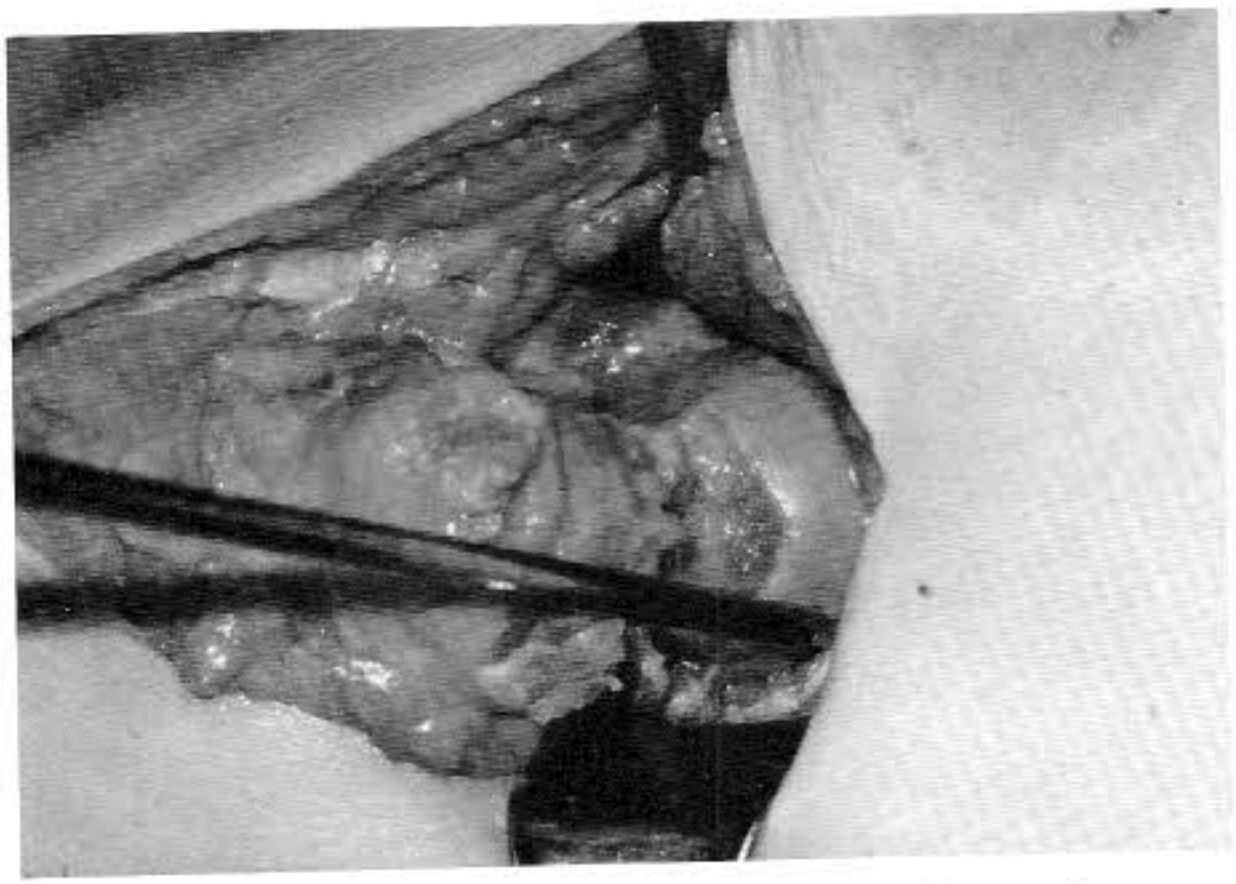


FIG. 1. Cadaver specimen showing the direct lateral approach to the hip joint.

TABLE 1. *Data on 11 patients who underwent hip arthroscopy*

Case	Sex	Age	Operative hip	Surgical indication	Surgical procedure
(1) I.B.	F	40	Left	Loose bodies	Diagnostic arthroscopy; removal loose bodies
(2) J.P.	F	33	Right	Arthritis, pain; status post slipped capital femoral epiphysis	Diagnostic arthroscopy; debridement
(3) R.B.	M	28	Left	Posttraumatic arthritis hip pain; avascular necrosis	Diagnostic arthroscopy; debridement
(4) L.J.	F	26	Right	Status post traumatic dislocation	Diagnostic arthroscopy; removal of osteochondral fragments
(5) J.H.	F	57	Right	Posttraumatic arthritic pain	Diagnostic arthroscopy; debridement
(6) M.B.	F	66	Right	Unresolved pain	Diagnostic arthroscopy
(7) G.H.	F	26	Right	Pain secondary to steroid-induced avascular necrosis	Diagnostic arthroscopy; debridement
(8) L.M.	F	55	Left	Unresolved pain	Diagnostic arthroscopy; debridement
(9) S.O.	F	37	Left	Posttraumatic arthritic pain	Diagnostic arthroscopy; debridement
(10) D.N.	F	44	Left	Unresolved pain	Failure of arthroscopic insertion
(11) K.R.	M	23	Left	Posttraumatic catching	Diagnostic arthroscopy; debridement of osteochondral lesion femoral head

hip upward (Fig. 2). Apply skin traction straps below the knee. Using fixed overhead pulleys, apply 25–50 lb of traction to maintain 45° of abduction and 10° of forward flexion. Hip abduction and flexion relaxes the capsule, and traction separates the joint so that insertion of the arthroscope is facilitated. Prepare and drape the hip in routine sterile fashion. Drape the leg so it can be easily grasped to rotate the hip.

At the midpoint over the superior edge of the greater trochanter, insert a 6-inch, 18-gauge spinal needle and maneuver it into the hip joint. If needed, use x-ray control (Fig. 3). Distend the joint with 30–50 ml of sterile saline solution. The reverse flow of fluid signals entrance into the joint. Next, make the stab incision at the needle site and direct the arthroscope sheath in the same direction as the needle into the hip joint (Fig. 4). Special extra-long cannulas and sheaths (5.25 inch) have been developed (Dyonics, Andover, MA, U.S.A.) to facilitate insertion and to maintain instrument position (Fig. 5). A sharp trocar is necessary to pass smoothly through the abundant tissues about the hip joint. Replace the sharp trocar with a blunt trocar after the capsule has been penetrated. Keep the joint clear for visualization by instilling irrigation solution through the arthroscope sheath, using either hand pressure via a syringe and extension tubing or an irrigation pump (3M arthroscopy pump 8300; 3M Co., St. Paul, MN, U.S.A.). Gravitational inflow does not provide sufficient pressure to keep the joint distended. Remove the blunt trocar and insert the arthroscope.

FIG. 2. The position of the patient's hip and leg for arthroscopy of the hip. The hip is abducted 45° and slightly flexed. The leg is held in traction by pulleys placed overhead. The leg is draped so it can be rotated.

Make a second and third portal, one approximately 3–4 cm anterior and one approximately 3–4 cm posterior to the first portal, using the same steps as above. At this point, the spinal needle can be visualized with the arthroscope as it enters the joint. Caution should be taken not to drift posteriorly away from the bony neck of the femur, as the slightly flexed position of the hip draws the sciatic nerve closer to the capsule. As long as the posterior portal incision is made directly over the greater trochanter and the instrument tips are not allowed to wander posteriorly, the sciatic nerve will not be placed in jeopardy. With the arthroscope in the middle portal, introduce the inflow/outflow cannula through the anterior portal and the operative instruments through the posterior portal.

If there is too much instrument crowding or an extra portal is required, the inflow/outflow cannula may be inserted by a direct anterior approach (Fig. 6) (3). Introduce the 6-inch, 18-gauge spinal needle at a point where a sagittal line through the anterior superior iliac spine meets a horizontal line from the proximal tip of the greater trochanter. Watch the needle enter the joint. Make the small stab incision at the needle site and insert a 5.25-inch long inflow/outflow cannula. Connect the irrigating tube to the cannula for the affluent or effluent irrigation solution. The femoral vessels and nerves are far medially and safely away from the anterior insertion site. To avoid the femoral artery, it should be palpated and marked prior to positioning and draping the patient.

The arthroscope, the inflow/outflow cannula, and

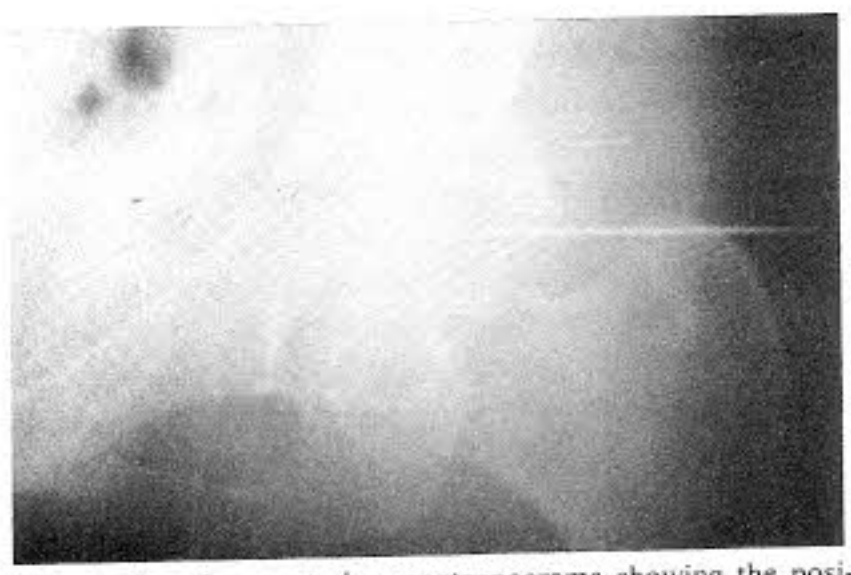


FIG. 3. Anterior–posterior roentgenograms showing the position of the spinal needle placed over the greater trochanter and entering the hip joint.

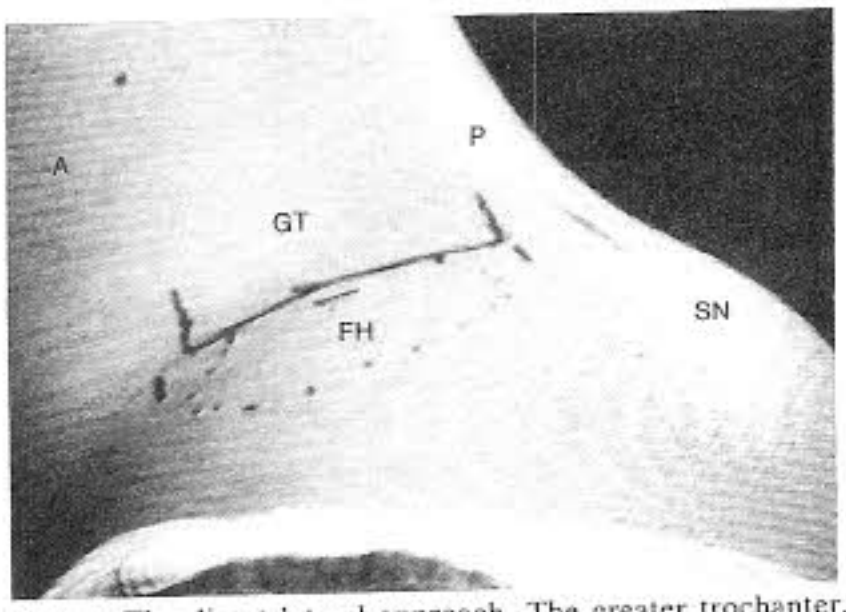


FIG. 4. The direct lateral approach. The greater trochanter, femoral head, and sciatic nerve are marked out on the right thigh. The small marks are the portals of entry. GT, greater trochanter; FH, femoral head; SN, sciatic nerve; A, anterior; P, posterior.

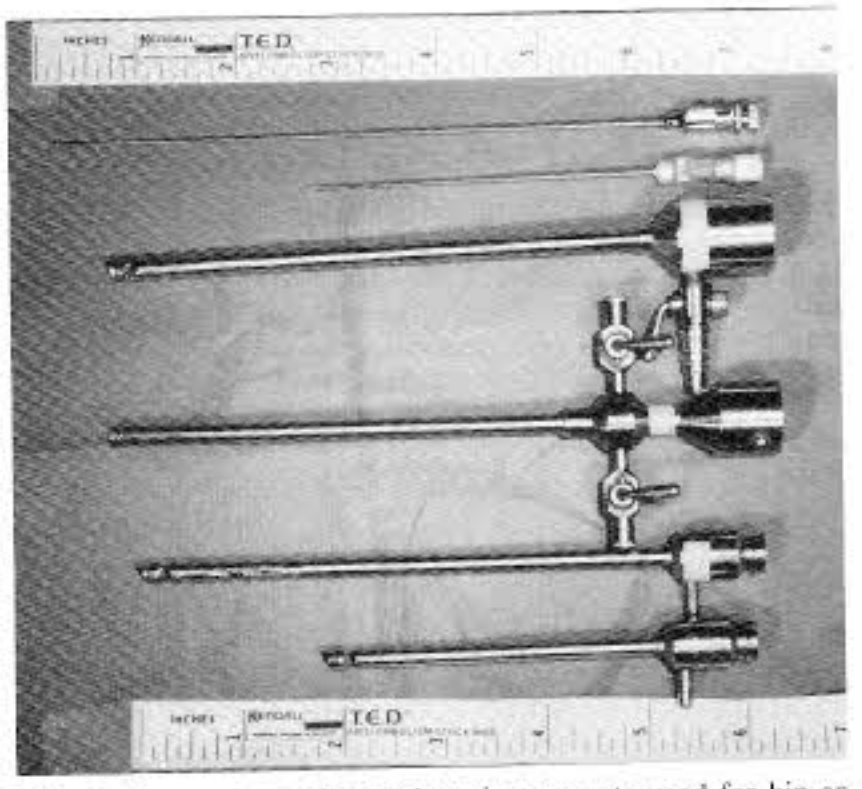


FIG. 5. Comparison of extra-long instruments used for hip arthroscopy to those that are the regular size. Note that extra length is gained on the arthroscope sheath. The connector portion (the one with the single stopcock) is shorter, making the sleeve portion longer.

surgical instruments may be interchanged between any of the portals. Removable cannula systems and switching rods make changing portals easier. A complete view of the hip joint can be accomplished by rotating the leg to visualize the femoral head and transferring the arthroscope to each portal.

Figure 7 demonstrates the position of the arthroscopic incisions about the hip joint and the relationship of the sciatic and femoral nerves. Figure 8 demonstrates the anatomy of the hip joint. Figure

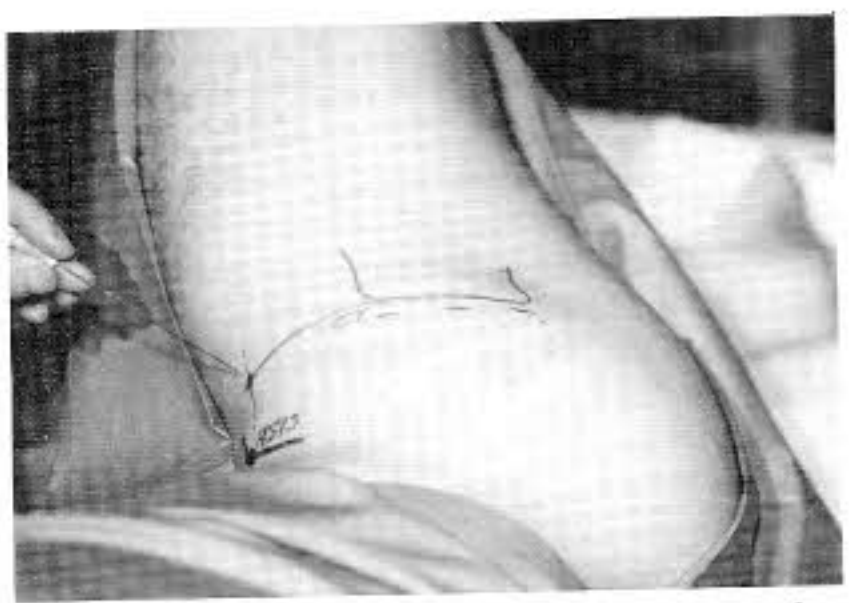


FIG. 6. Direct anterior approach. One line is drawn down from the anterior superior iliac spine (ASIS); another line is drawn over from the top of the greater trochanter (GT). The incision is made at the point where the two lines cross. A spinal needle marks the point.

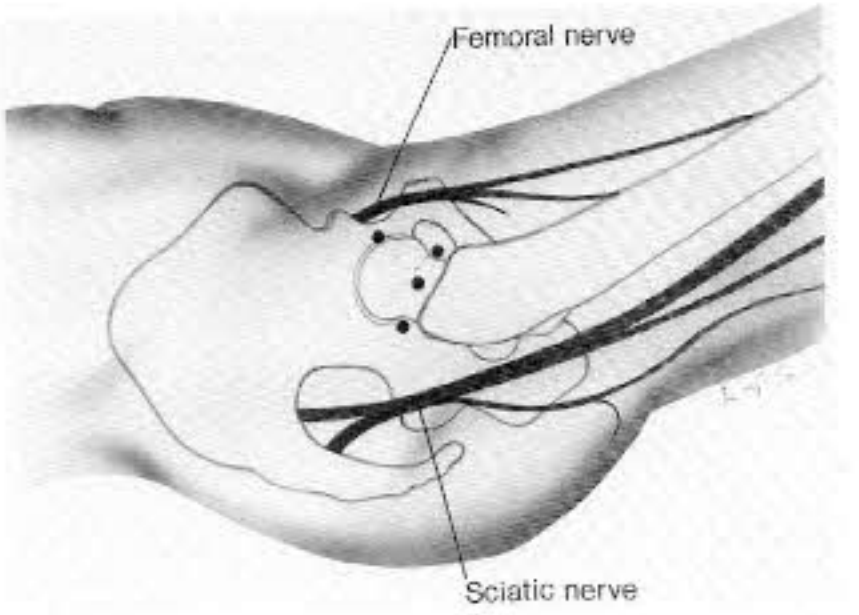


FIG. 7. Diagram of the arthroscopic incisions around the hip joint and their relationship to the sciatic and femoral nerves.

8A is a diagram of the acetabulum in relation to the arthroscope. Figures 8B and C are arthroscopic views of a normal hip joint. Note the position of the ligamentum teres. This structure is best seen with the arthroscope directed to the medial part of the joint.

RESULTS

Visualization of the entire hip joint was accomplished in 10 of 12 hips in 11 patients. Technical difficulties that might arise in any new procedure may have been the reason for our failing to obtain a satisfactory view of the hip in two cases of unresolved pain. In one patient, although the arthroscope was inserted uneventfully, adequate visualization was not achieved. We were not able to determine the cause of this difficulty. In a second patient, we were not able to enter the hip joint with the arthroscope, even with the C-arm image intensifier to assist us. Although this patient was obese and had had previous surgery and infection about the hip, we were unable to satisfactorily explain our inability to enter the hip joint.

Ten hips in nine patients (one had arthroscopy twice) were arthroscoped adequately by the new lateral approach. One patient had recently sustained a dislocated hip, and after closed reduction, a loose fragment in the hip joint was seen roentgenographically. Another patient also was known to have loose bodies from previous trauma. The loose fragments were successfully removed in both cases. A third patient was arthroscoped diagnostically for persistent clicking and catching following trauma.

8A

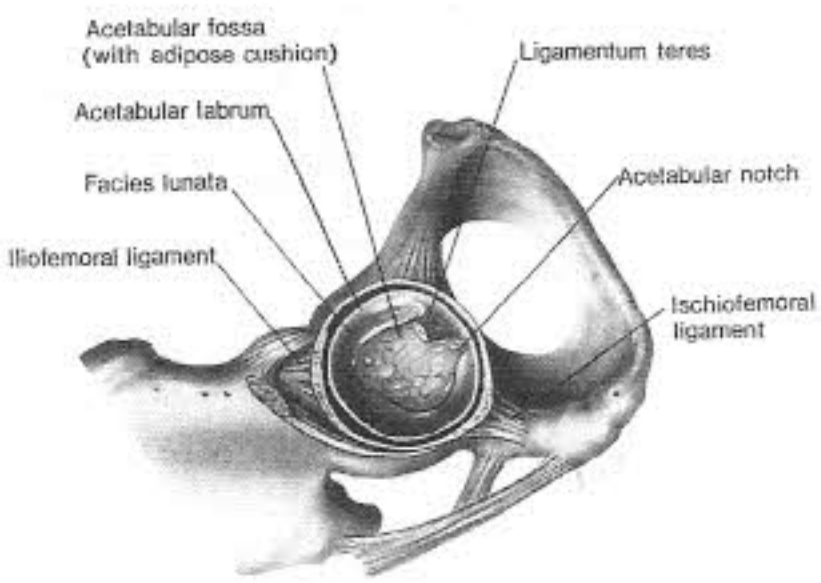
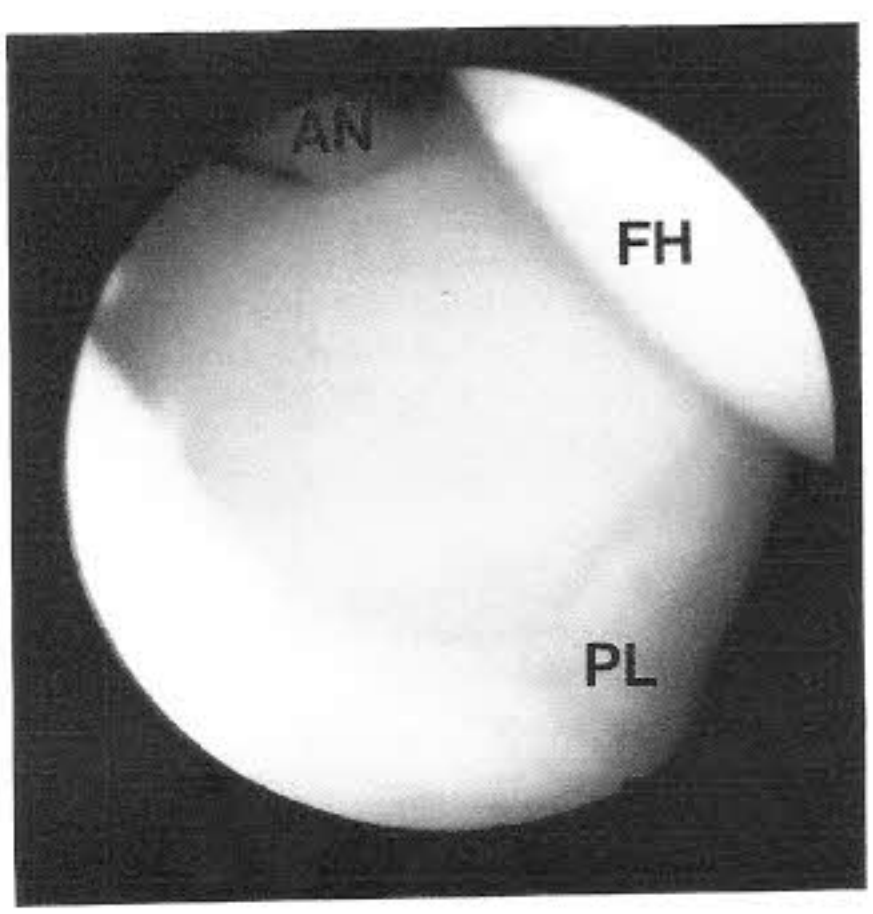
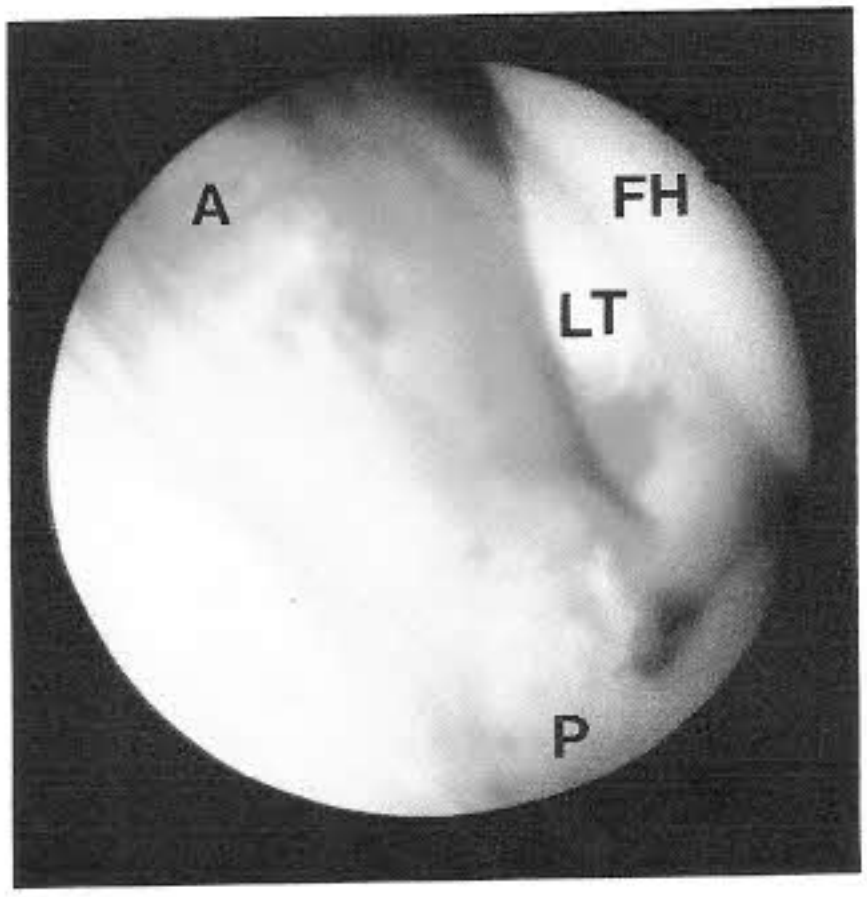


FIG. 8. (A) Diagram of a right acetabulum. Note the increased thickness of the anterior hip capsule due to the iliofemoral ligament. (B) Posterior aspect of the right hip joint. FH, femoral head; AN, acetabular notch; PL, posterior labrum. (C) Deep interior of the right hip joint, demonstrating the ligamentum teres. FH, femoral head; LT, ligamentum teres; A, anterior, P, posterior.

8B,C





An osteochondral lesion on the femoral head was noted to rub against the posterior rim of the acetabulum with rotation of the femur. The lesion was debrided with motorized instruments.

Four patients were arthroscoped primarily to diagnose the extent of arthritic changes in order to plan subsequent treatment. Two were arthroscoped for unresolved pain following several months of conservative treatment. Irrigation and debridement, including abrasion of damaged cartilage and removal of inflamed synovium, was performed as indicated. All six showed initial symptomatic improvement. Prosthetic replacement was delayed approximately 17 months in one patient, whereas the others have continued to experience less pain at an average follow-up of 5.4 months (range 4–19 months).

Four of the 11 patients were treated as outpatients. Three patients stayed overnight because surgery started late in the day. One patient stayed overnight due to postoperative pain. Three patients remained in the hospital for reasons unrelated to arthroscopy.

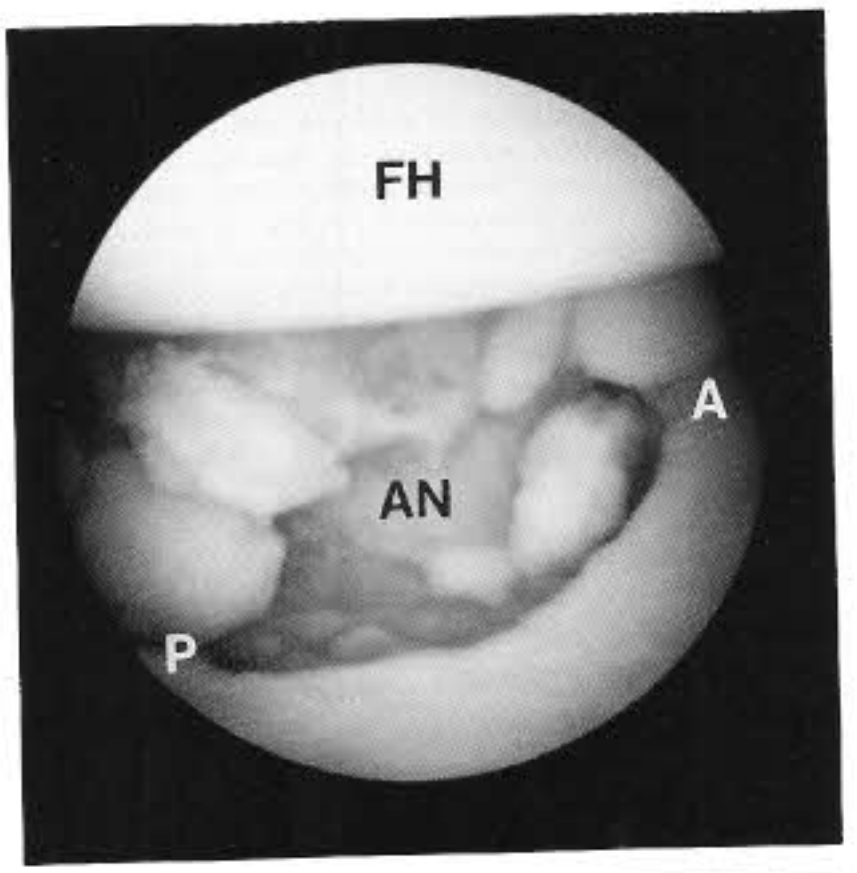
CASE REPORTS

Case 1

J.B. is a 40-year-old woman who injured her left hip in an airplane crash in September 1980. She was first examined in our office in October 1984. She

complained of pain, "catching," and a feeling as if something were slipping in and out of her hip joint. She limped. Her pain could be initiated on abduction and rotation. Roentgenograms showed loose bodies in the acetabular notch. In November 1984, an attempt was made to retrieve the loose bodies arthroscopically by the anterior approach, but the loose bodies could not be visualized. The patient was brought back to the operating room in June 1985, and this time, all of the loose bodies were found and removed arthroscopically using the new lateral approach (Fig. 9A). On the first pass, a piece of the grasper broke off and fell next to the five loose bodies and was easily retrieved with another grasper (Fig. 9B). This patient was relieved of her symptoms and remained asymptomatic at 15 month follow-up.

9A



9B

FIG. 9. (A) Loose bodies in the notch of the acetabulum of the left hip. FH, femoral head; AN, acetabular notch; A, anterior; P, posterior. (B) Picture of the loose bodies removed from the hip shown in A. Note the broken piece of the grasper below the knife handle.

Case 2

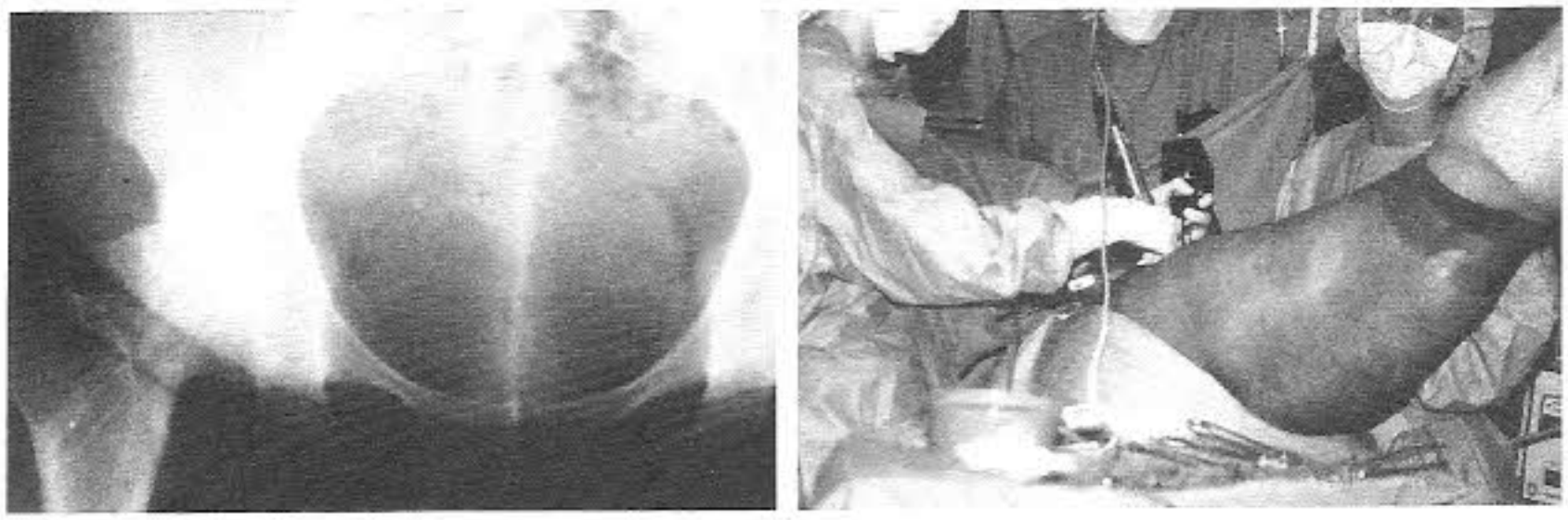
J.P. is a 33-year-old, 5′7″, 250-lb woman. When she was 12 years old, a slipped capital femoral epiphysis of her right hip was reduced and fixated with metallic pins. Chondrolysis and avascular necrosis of the femoral head developed. In February 1967 (the patient was 14 years old and obese), the three pins were removed. The femoral head received bone grafts from the right tibia and an adductor release was performed (10). She did well for the next 17 years. In late 1984, disabling hip pain at night developed. Restricted weight bearing and antiinflammatory and analgesic medications failed to provide relief. Roentgenograms showed degenerative changes in the hip joint (Fig. 10A). In May 1985, an arthroscopic debridement of the right hip was performed (Fig. 10B). Figure 10C shows degenerative changes in the femoral head and acetabulum. Following the procedure, her symptoms improved and her night pain was relieved. She is presently 17 months postoperative and uses a cane for ambulation.

Case 3

R.B. is a 28-year-old male motorcycle mechanic, who sustained a subcapital fracture of the left hip in a motorcycle accident in June 1984. The fracture was fixated with a compression hip screw and sideplate. He subsequently developed avascular necrosis of the femoral head, with disabling pain. In April 1985, arthroscopy was performed to determine the extent of changes in the hip joint in order to plan subsequent treatment. Only the femoral head was involved. There were no changes in the acetabulum. The nail was seen to be protruding through the femoral head. A debridement of the hip was performed, and the metallic fixation device was later removed. Hemiarthroplasty was recommended at this time. The patient's symptoms improved remarkably, however, and he refused further treatment, returning to his job as a motorcycle mechanic.

His pain relief lasted for approximately 1 year. In March 1986, the patient returned to our office with severe hip pain. He was unable to work. Arthroscopy was repeated in April 1986. The femoral head was completely denuded of its articular cartilage, and the acetabulum showed moderate involvement. Arthroscopic debridement was performed. The de-

10A,B



10C

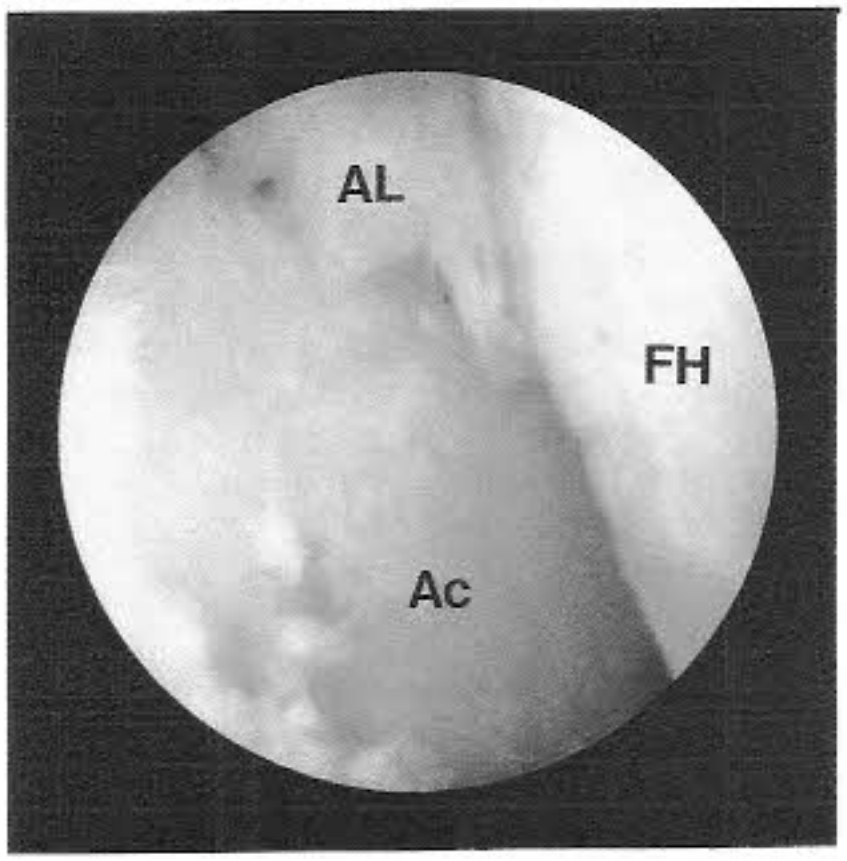


FIG. 10. (A) Roentgenogram of a 33-year old, 250-lb woman with severe degenerative arthritis of the right hip. This patient had an old slipped capital femoral epiphysis and chondrolysis. Note the outline of the bone grafts in the femoral head. (B) The leg in 45 lb of traction. The view is from the posterior side. Note that the position of the motorized shaver is posterior, and the arthroscope with the camera is more anterior. Both are over the edge of the greater trochanter. (C) Arthroscopic view of the hip. Note the irregular anterior labrum (AL), the denuded acetabulum (AC), and the irregular femoral head (FH).

bridement smoothed rough edges of the femoral head and removed inflamed synovium through use of motorized instruments. Following this procedure, arthroplasty was again recommended. However, the patient's symptoms again improved and he returned to work, refusing further treatment. In fact, at 4 days following his second arthroscopy, the patient had to flee from an explosion. He was able to do so without crutches and with no complaint of pain in his hip. Unfortunately, the patient's pain recurred after 4 months, at which time he consented to hip arthroplasty.

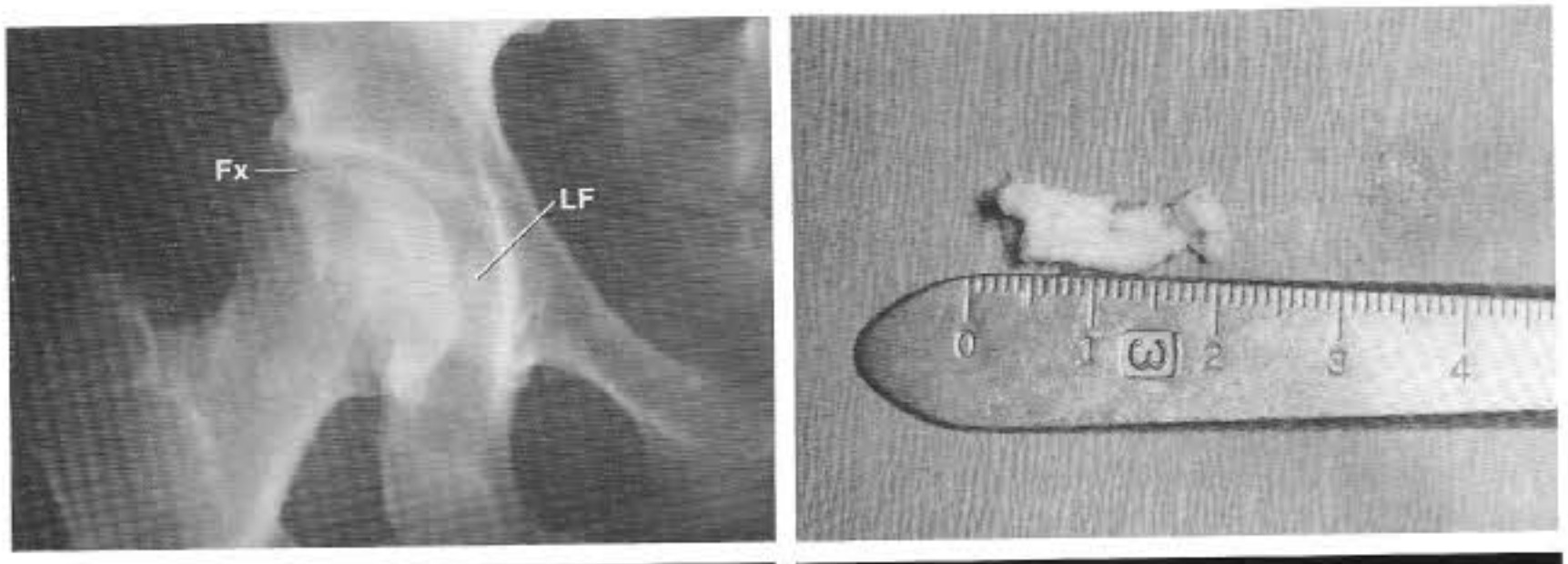
Case 4

L.J., a 26-year-old woman, sustained, among other injuries, a dislocated right hip when she was knocked off of a motor scooter. The hip was reduced by manipulation on the same day. Subsequent roentgenograms showed a loose fragment in the joint and a fracture of the lip of the acetabulum (Fig. 11A). Nine days postreduction, arthroscopy was performed. The fragment was located and removed (Fig. 11B and C). Damage of the femoral head and fracture of the acetabulum were noted (Fig. 11D). These areas were shaved with motorized cutters. The fragments most likely came from a damaged area on the femoral head that was not present on roentgenograms and was not appreciated on the computed tomography (CT) scan. At the time of this writing, the patient is 2 months postoperative and has regained full unsupported weight bearing ability.

DISCUSSION

Although the first description of arthroscopic examination of the hip was presented by Burman (11) in 1931, it is only recently that subsequent reports

11A,C



11B,D

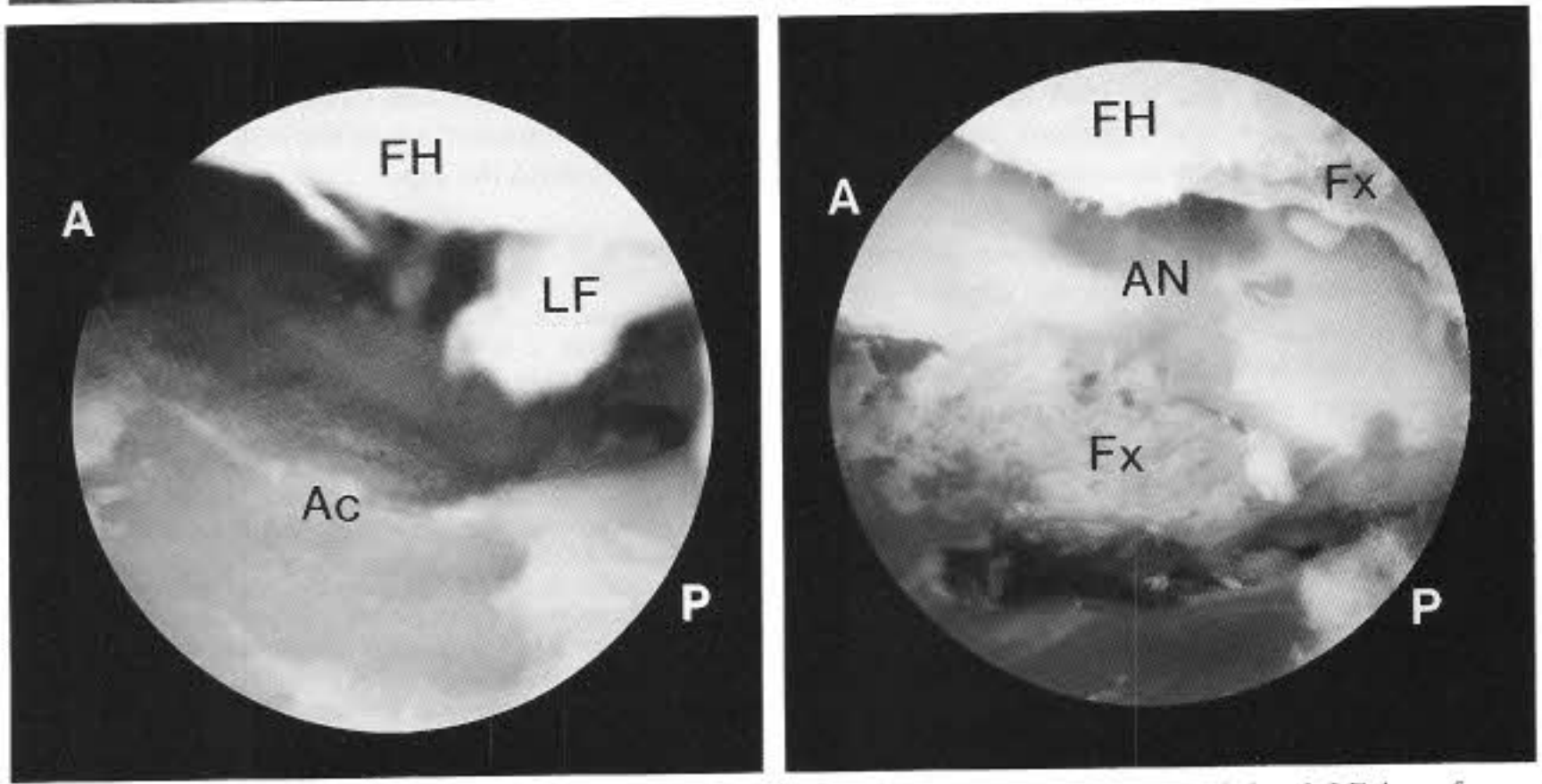


FIG. 11. (A) Roentgenogram of a 26-year old woman after her right fracture dislocation had been reduced closed. LF, loose fragment; FX, fracture of lip of acetabulum. (B) Arthroscopy of her right hip. FH, femoral head; Ac, acetabulum; A, anterior; P, posterior; LF, portion of loose fragment on edge. (C) Two-centimeter loose fragment from the right hip. (D) View of the right hip showing the fractures of the femoral head and acetabulum. FH, femoral head; AN, acetabular notch; A, anterior; P, posterior; FX, fracture.

have appeared in the literature (1–8,12,13). In all of these reports, arthroscopy was performed through an anterior approach. Although the anterior approach is technically easier than the lateral approach described in this report, it does not provide adequate visualization of the posterior aspects of the hip joint. In 1980, Vakili et al. (13) described the use of arthroscopy to remove entrapped acrylic cement following revision total hip arthroplasty. Using the anterior approach, the fragments could not be directly visualized. Similarly, in our hands, the anterior approach proved to be unsatisfactory for the visualization of posteriorly located loose bodies (case 1). Hence we felt another approach was needed. Fortunately, the new lateral approach described here was serendipitously conceived during a total hip arthroplasty shortly thereafter. Using the lateral approach, the loose bodies were readily visualized and removed.

The hip is difficult to approach arthroscopically because it lies deep within subcutaneous and muscular tissues. The lateral approach offers a relatively secure and effective method of entering and visualizing the entire joint. Although the sciatic nerve and femoral nerve and vessels lie away from the portals of entry, controlled insertion and careful manipulation of instruments minimize possible risk to these structures (Fig. 7).

The indications for hip arthroscopy in this preliminary report included diagnostic evaluation for unresolved pain following failure of conservative treatment, evaluation of femoral head and acetabular involvement to help plan treatment for persistent arthritic hip pain or posttraumatic avascular necrosis, and exploration, debridement, and removal of loose bodies following fracture and/or dislocation of the hip. Epstein reported on the importance of removing loose fragments and debris from fracture dislocations of the hip (14,15).

The long-term results of debridement of the arthritic hip remain to be established before proposing this as a surgical indication for arthroscopy of the hip. Our main reason for arthroscopy in the arthritic hip was to help us plan subsequent surgery. To our surprise, debridement provided pain relief and the planned arthroplasty was delayed. Similarly, Gross (7) reported pain relief following arthroscopic irrigation and debridement in three patients with chondrolysis following slipped capital femoral epiphyses. Although arthroscopic debridement and lavage have been shown to have therapeutic value in symptomatic osteoarthritis and pseudogout of the knee (1,2,16,17), a similar effect has not been previously described for the hip. We cannot explain the reason for the relief of pain in the cases that were debrided. Removal of inflamed synovium may have been a contributory factor.

Other applications that have been described in the literature for hip arthroscopy include synovial biopsy and joint evaluation in chronic juvenile arthritis (8); evaluation of the hip in other disorders in children, including congenital dislocation, Legg Calve-Perthes disease, neuropathic subluxation, residuals of prior sepsis, and slipped capital femoral epiphysis (7); evaluation of the femoral head with osteochondritis dissecans (6); and removal of entrapped methylmethacrylate following total hip arthroplasty (12,13). In cases of planned revision arthroplasty, where infection is present or suspected and needle aspiration cultures are negative, biopsy of the synovium performed arthroscopically may provide useful information (6).

Although it is in its infancy, the benefits of hip arthroscopy are apparent. It offers little postoperative morbidity and can be performed on an outpatient basis. The prompt recovery from the operation is also beneficial, particularly for elderly patients.

One hopes that with further experience and continued improvement in surgical instrumentation and technique, the therapeutic usefulness of hip arthroscopy will provide patient benefit, not only in the applications described above, but also in those yet to be revealed.

SUMMARY

Arthroscopy of the hip by the new lateral approach was performed successfully in 10 of 12 hips. The entire joint was visualized in all 10 hips. Complete surgical instrumentation was possible. The procedure is reproducible and safe. The lateral approach promises to allow arthroscopy of the hip to become a valuable and useful addition to our therapeutic armamentarium in the treatment of disorders of and around the hip.

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