Hip and groin injuries, which account for 5–6% of reported injuries, are prevalent among adult athletes. In recent years, an increase in acetabular labral tears and cartilage damage due to femoroacetabular impingement (FAI) has been documented. FAI can result from either a “pincer” or a “cam” mechanism. The pincer mechanism is the result of excessive bony projection of the acetabular rim, which decreases space for the labrum movement and produces a shearing effect. Cam-type impingement is the result of a nonspherical femoral head and an abnormal head-neck offset in relation to the distal femur. Most FAI patients have a combination of both the cam-type and pincer-type impingement.

Excess bone formation can cause excessive wear on the hip labrum and joint, which can lead to degeneration of the labrum, articular cartilage damage, and osteoarthritis. The cam impingement that is created by a prominent bony formation on the non-spherical head of the femur typically results in selective delamination of the articular surface of the acetabulum and the labrum is unaffected. The pincer impingement that is caused by the bony projection of the acetabular rim primarily affects the labrum, and secondarily results in articular damage to the acetabulum. Research has demonstrated that cam-type FAI is more common among men and among individuals with diminished internal rotation of the hip. Prevention programs for FAI do not currently exist. Conservative treatment consists of early recognition of FAI symptoms, management of pain, and modification of activities. Surgical intervention is indicated if the individual is unresponsive to conservative treatment.

Case History

A 22-year old male NCAA Division I soccer player reported having experienced right hip pain during pregame warm-up activity. The athlete had been sitting and sleeping on a bus for ten hours in a hyper flexed hip position the previous day. He complained of inability to produce power through his hip to kick or punt the soccer ball. Pain was localized on the lateral aspect of his hip over the greater trochanter, with pain radiating down the ilio-tibial band (IT band). He denied any previous injury to his right hip. Manual muscle tests were normal for strength but elicited pain in his lateral hip and groin. The athlete was unable to play in the game. The athletic trainer assessed the injury as IT band tightness, and the athlete was treated with stretching and cryotherapy. He was referred to the team physician for evaluation of hip pain at 2 days postinjury.

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Diagnosis and Treatment

The differential diagnoses for lateral hip and groin pain in a soccer player is broad, including IT band syndrome, greater trochanteric bursitis, rectus femoris strain/tear, iliopsoas strain, iliopsoas bursitis, adductor strain, athletic pubalgia, inguinal hernia, hip labral tear, and avascular necrosis of the femoral head. Due to the localization of symptoms to the lateral hip area, the decision was made to start with conservative treatment that consisted of modalities, soft tissue mobilization, and progressive resistance exercises for IT band syndrome and greater trochanteric bursitis. The athlete was restricted to pain-free activity.

After three weeks of conservative treatment, the athlete had demonstrated little improvement and his pain had migrated in an anterior direction. Pain was localized over the anterior inferior iliac spine (AIIS) and was exacerbated by a resisted straight-leg raise.

Plain radiographs revealed an apparently old avulsion injury to the AIIS (Figures 1 and 2). The radiographs also revealed a subtle cam-type deformity of the femoral neck. The athlete’s rehabilitation program was subsequently modified to focus on hip flexion and hip adduction straight-leg raises that were resisted by ankle weights and elastic tubing. Bridges, planks, and lower abdominal isometrics were implemented to improve core strength. The athlete was restricted from performing any exercises that increased his pain.

After an additional three weeks of rehabilitation, the athlete had failed to improve and still could not generate power when kicking. Magnetic resonance imaging with intra-articular contrast of his right hip was obtained, which confirmed the existence of a cam-type deformity of the femoral neck, with a significant osseous abnormality and extensive labral tearing (Figures 3 and 4). Because bupivacaine was administered prior to performance of the diagnostic imaging procedure, the athlete...
experienced relief of pain for several hours afterward. Due to the failure of conservative management and the pain relief that was produced by intra-articular injection of bupivacaine, the athlete was referred to an orthopedic surgeon with specialized expertise in hip arthroscopy.

**Surgical Intervention**

An arthroscopic procedure was performed that included debridement, labral repair, and femoroplasty to address the cam-type impingement. Complex radial fibrillated tears in both the anterior and lateral portions of the labrum were evident, along with grade 3 and grade 4 chondral damage on the acetabular rim. A pincer lesion was identified along the anterolateral rim of the acetabulum, which was combined with a substantial cam lesion. Debridement of the pincer lesion was necessary to preserve the repaired labrum. Reshaping the femoral head alleviates the cam-type impingement caused by the non-spherical shape of the head of the femur.

Following capsulotomy, the pincer lesion was identified, which was concentrated around the prominence of the anteroinferior iliac spine. The bone was recontoured through removal to a depth of 4–5 mm. The main substance of the labrum was preserved, which was reattached after the pincer lesion had been removed. A dense synovial metaplasia was debrided from the acetabular fossa while preserving the ligamentum teres. A femoroplasty was performed to remove 6 mm at the apex of the cam lesion with distal tapering. The impingement lesion was carefully decompressed, with special attention to avoid a notch in the femur or to leave a potential stress riser.

**Rehabilitation**

The athlete’s rehabilitation followed a 12-week protocol that was divided into four phases. Phase 1 of the protocol was focused on restoration of range of motion and strength during the first 3 weeks following surgery. The athlete’s range of motion was limited to 90 degrees of hip flexion and 0 degrees of external rotation. He was allowed to partially bear weight (~50%) for the first four weeks following surgery.

Phase 2 of the protocol was implemented during the fourth through sixth postsurgery weeks. Hip range of motion was limited to 105 degrees of flexion and 20 degrees of external rotation. Full weight bearing should be encouraged at this stage, assuming that no gait deviations exist. Progressive resistance exercises for the core and lower extremity were advanced as tolerated. Joint mobilizations and hip stretching were performed, and the athlete was allowed to utilize a stationary bike and an elliptical trainer as tolerated.

Phase 3 of the protocol corresponded to the seventh and eighth postsurgery weeks. The goals were to restore full range of motion in the hip, while continuing to achieve gains in muscular endurance, strength, proprioception, and balance. Cardiovascular endurance exercise was initiated during this phase. Joint mobilizations and hip stretching were continued. The athlete regained full range of motion at 7 weeks postsurgery. He performed one hour of cardiovascular exercise 5 days per week, utilizing both a stationary bike and an elliptical machine.

Upon initiation of phase 4 of the rehabilitation protocol at nine weeks postsurgery, the athlete demonstrated hip flexion strength that was greater than 70% of that for the uninvolved side, and hip adduction, extension, internal, and external rotation strength that was greater than 80% of that for the uninvolved side. Treadmill jogging, agility drills, plyometric exercises, and resistance band walking patterns were subsequently initiated. Running speed was progressed until the athlete could perform forward and backward sprints of 10, 20, and 30 yards without pain or limitation, and running distance was progressed up to four miles on two to three days per week. The athlete began to perform basic soccer-related drills and goalie-specific drills involving passing and catching the ball. The intensity of the sport-specific activities was increased on the basis of the athlete’s tolerance. Criteria for a full return to competition included full hip range of motion, hip strength equal to that of his uninvolved side, and the ability to perform all sport-specific drills without pain. The athlete was cleared for participation at 5 months postsurgery, and he was able to return to college athletics without restrictions.

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References


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