Rehabilitation of Soft-Tissue Injuries to the Hip

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Anatomical injuries to the hip can present with similar symptoms regardless of whether the injury was sustained through an athletic event. Therefore, the management of such injuries might not differ between an athlete and a nonathlete, but the goals of the individual, the physiological status of the tissue that has been impaired, and the underlying physical health status of the individual all contribute to the rehabilitative decision-making process. The goals of an athlete might be more physically demanding and require a facilitated temporal approach toward meeting such outcomes. As such, when developing an intervention that meets the needs of the athlete one must consider the most efficient method of returning him or her to athletic activity with minimal risk of compromising the healing process.

Anterior Muscles

Strains to this area are common, frequent, and more likely to be seen in athletes who have decreased hip flexibility or muscle strength. Oftentimes, after a strain to the rectus femoris or iliopsoas muscles, deficits in measurable active and passive hip extension and active hip flexion result. This can be treated with soft-tissue mobilization, static stretching, friction massage, or proprioceptive neuromuscular facilitation. The extent of the injury and the pain tolerance of the athlete will determine the type and progression of the intervention. Regardless of the technique chosen the clinician should pay careful attention to isolating the muscle structure involved. Much of the treatment should focus on reducing pain, a common finding after acute muscle strains. Early care might also involve using externally applied wraps to assist with structural compression and provide proprioceptive feedback (Figure 1).

Cryotherapy is helpful for superficial pain reduction but might not have any effect on the healing of the involved tissue.
or the reduction of inflammation at the tissue depths involved with muscle strains to this area. Electrical stimulation can be used to inhibit pain and deter muscle atrophy in the early phases of rehabilitation, typically relying on sensory-mode application with a comfortable waveform for pain relief and a current applicable for muscle contraction for deterring muscle atrophy.

Contusions to the anterior thigh are commonly seen in contact and collision-type sports. In football, thigh pads are required to reduce the severity of such injuries. In other sports that require physical contact, however, one might choose to not wear pads. Significant contact to the anterior thigh area will result in acute bleeding and hematoma formation that can also lead to decreased hip range of motion. If this bleeding is not addressed early, strength deficits could result and performance might be affected. It has been reported that participation might be limited for anywhere from a few days to a few weeks after contusions to this area. Early intervention must also carefully screen for the possibility of a myositis ossificans formation, usually found in the midbelly of the rectus femoris muscle. This heterotrophic bone formation will rapidly generate into larger proportions, with aggressive stretching during the acute phase to subacute phases of healing. If myositis ossificans develops, aggressive intervention such as passive stretching should only be performed in the later stages of healing, and one should expect the athlete to have increased levels of discomfort.

Iliopsoas Syndrome

The iliopsoas bursa lies just anterior to the pelvic brim and can be irritated by acute trauma or overuse. An athlete with iliopsoas syndrome, as it is referred to, will present with anterior hip pain that increases with level of activity, localized palpable tenderness in the femoral triangle region, a self-described feeling of the hip “snapping,” and a positive Thomas test. The audible and perceptual “snap” might be the result of a sudden movement of the iliopsoas tendon as it travels over the bony prominence of the anterior inferior iliac spine, the ilipectineal eminence, or the ridge of the lesser trochanter.

Conservative treatment interventions for iliopsoas syndrome are oftentimes successful but can take up to 8 weeks for resolution. Such treatment consists of general stretching of the iliopsoas, global hip-muscle strengthening, electrical stimulation for pain reduction, and thermal agents for muscle relaxation. Johnston and colleagues propose a hip-rotational strengthening program to treat iliopsoas syndrome. They found a 77% successful outcome when targeting the internal and external rotators of the hip through the use of elastic resistance in an isometric manner. When conservative intervention fails, surgical options that divide the psoas aponeurotic fascia, lengthen the iliopsoas tendon, or resect the prominent bony spur contributing to the snap might be indicated.

Posterior Muscles

On the posterior aspect of the thigh, the three hamstring muscles play a large role in producing hip-extension force, as well as allowing hip-flexion range of motion. A strain to the hamstring muscles occurs in a sudden burst of movement. When this happens the athlete will complain of feeling a “pull” and might note that he or she heard an audible “pop.” Examination will reveal painful and weak active knee flexion and hip extension and passive hip flexion with simultaneous knee extension, and a palpable defect in the area of the ischial tuberosity might be found. This type of injury is more prevalent in athletes who perform eccentric maneuvers.

The treatment intervention, like the mechanism of injury, is similar to that of the quadriceps group, but more work has been done in the area of hamstring-muscle strains that supports a relationship between causation, prevention, and injury. Hamstring-muscle weakness, decreased hamstring-muscle flexibility, lack of proper warm-up, fatigue, an improper flexor:extensor strength ratio, increasing age, menstrual disturbances, and previous posterior thigh injuries are suggested as predisposing factors to hamstring injuries. In athletes who take part in sprintlike activities, poor eccentric hamstring strength has been demonstrated to have a positive relationship with predisposing one to injury. This suggests that eccentric strengthening be emphasized during the rehabilitation program. When palpable and reported pain appear to be near the proximal attachment of the hamstrings along the ischial tuberosity, imaging studies should be used to rule out avulsion fractures before any progressive
passive hamstring stretching, active strengthening, or low-frequency ultrasound intervention.

Even though decreased hamstring flexibility has been noted as a predisposing factor for hamstring strains, it is unclear whether a stretching program for these muscles truly enhances one’s overall hip flexibility. Halbertsma and colleagues\textsuperscript{11} studied the effects of one session of static stretching on the hamstring muscles and concluded that any increases in extensibility found are not related to the single stretch but, rather, associated with an increase in stretch tolerance over time.

There has been some interesting recent work to complement our knowledge of stretching as it relates to hamstring flexibility. With individuals age 65 and over, Feland et al.\textsuperscript{12} purport longer static-stretch hold times for the hamstring muscle group in order to achieve both greater immediate and more sustained gains in range of motion. Although unable to detect a difference in gains between static stretch and proprioceptive-neuromuscular-facilitation techniques, Worrell et al.\textsuperscript{13} did conclude that increasing one’s overall hamstring flexibility will increase one’s hamstring-muscle performance when tested at slower isokinetic speeds. Perhaps of most interest is the work of Sullivan and colleagues,\textsuperscript{14} who demonstrated that successfully placing the pelvis in an anterior pelvic tilt is more important than the particular individual stretching method chosen. From a more practical perspective, Wenos and Konin (unpublished data, 2002) suggest that a warm-up activity equivalent to 70% of one’s heart-rate reserve or a respiratory-exchange ratio of 1.0 is superior to the effects of static stretch or proprioceptive neuromuscular facilitation for hip range of motion and hamstring flexibility. The authors equate these physiological levels to approximately a 4-min endurance-type warm-up.

**Medial Muscles**

Muscle strains to the adductor group are commonly seen in athletes who participate in sports that require lateral movement. This includes activities such as basketball, tennis, volleyball, and skiing, to name a few. Loosli and Quick\textsuperscript{15} describe a tool for assessing adductor flexibility: The athlete is asked to sit in the “butterfly” groin-stretch position with the heels 6 in. from the crotch (Figure 2). The athlete should then be able to bring his or her knees down to within 6 in. of the floor, with a measurement taken from the lateral side of the patella.

Adductor muscle strains are treated slightly differently than other hip-related muscle injuries. This is not because of any evidence-based protocol but rather based on the practical fact that many athletes are not comfortable having cryotherapy or ultrasound treatments applied to the groin area, in which the majority of adductor strains occur. Gentle and progressive stretching to this area, however, should be maintained and encouraged at least to improve flexibility to the adductor muscles to prevent injury recurrence. Though not reliably supported, external wraps to limit the amount of active and passive hip abduction have been used in the athletic population and appear to provide a sense of proprioception and comfort to athletes (Figures 3a and b). Exactly how effective such a technique is remains to be determined.

**Lateral Muscles**

The muscles on the lateral aspect of the hip include the gluteus medius and the tensor fascia latae, which are rarely strained as a result of athletic activities. Rather, the repetitive contraction of these muscles, coupled with the compression they produce as they glide over the greater trochanteric region, contributes to other soft-tissue pathology. These muscles on the lateral aspect of the hip can compress over the prominent bony ridge of the greater trochanter, compressing the bursa that lies underneath and ultimately

![Figure 2](image-url)
leading to a trochanteric bursitis or a snapping-hip phenomenon.

Snapping of the hip is a direct result of the proximal aspect of the iliotibial band as it meshes with the tensor fasciae latae rubbing on the greater trochanter during movement of the hip. Pain might also be present along the lateral aspect of the knee where the iliotibial band lies over the lateral femoral condyle, crossing this structure from anterior to posterior during knee flexion and extension. The key with symptoms of pain and snapping that present at either the lateral aspect of the hip or the knee is to recognize the nature of the tissue structure. As the tensor fasciae latae travels distally to become the iliotibial band, the physiological make-up is one that is less conducive to elastic and ultimately plastic deformation as a result of gentle, prolonged stretching at its distal attachment. Localized intervention to control pain and inflammation might be necessary at both the hip and the knee, but stretching techniques should focus on the proximal structures that possess greater musculotendinous properties. As a result of the biomechanical alignment of the knee joint, stretching the iliotibial band at this location would essentially require an adduction moment, something that the tibiofemoral joint does not lend itself to easily. External compression wraps are not advised with snapping-hip symptoms because they can create greater compressive forces over the greater trochanter.

Establishing a thorough differential diagnosis is paramount in treating lateral hip injuries. Collee et al. reported that in 45% of hospital-referred patients with chronic low back pain, symptoms of greater trochanteric bursitis were present. In these patients, radiating pain and paresthesia in the leg were also found to be present in addition to lateral hip pain. Traycoff supports the challenge of a differential diagnosis with lateral hip pain; he has labeled pain to the lateral hip associated with such conditions as lumbar radiculopathy and lumbar facet syndrome as “pseudo-trochanteric bursitis.” Perhaps of greater concern are reported cases of a nondisplaced complete femoral-neck stress fracture found in a 46-year-old male runner and a giant-cell carcinoma reported in a young athletic woman 9 months after she was diagnosed and treated for trochanteric bursitis, both presenting with similar lateral hip pain increasing with activity.

**External Rotators**

Piriformis syndrome is a condition that presents posterior thigh pain and posterior leg radiculopathy as a result of the sciatic nerve being compressed where it lies beneath the piriformis muscle. Pain might also be present with sitting, because the muscle will be both on stretch and exposed to external compressive forces. Both active external rotation and passive internal rotation will be diminished and painful. The combined movement of hip flexion, adduction, and internal rotation has been reported as a method of assessment (Figure 4). Palpable tenderness might also be noted, indicating the specific location where tissue tightness might exist.
Treatment for piriformis syndrome focuses on stretching the external rotator muscle itself without adding increased compression over the sciatic-nerve area. Deep manual therapy and low-frequency ultrasound can also help elongate the piriformis muscle tissue. When treating an athlete for piriformis syndrome, accurate measurements of range of motion and strength should be recorded to assess progress and minimize the risk of recurrence of injury. Simoneau et al.²¹ have demonstrated varying hip internal and external measurements between seated and prone positions, recommending strongly to document measurement position and reproduce measurements in the same position.

**Summary**

Soft-tissue injuries to the hip are commonly seen in athletes. The tissues involved include muscles, tendons, and bursa. Most rehabilitative approaches focus on conservative, nonoperative care, paying attention to controlling symptoms of pain and inflammation. Oftentimes muscle elongation is required to facilitate adequate healing and reduce the incidence of injury recurrence. Because many soft-tissue injuries to the hip occur as the result of overuse mechanisms, limiting activities with a controlled progression to return to participation is required.

**References**


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