AMERICAN HEALTH CONSULTANTS®

Primary Care Reports™

The Practical Journal for Primary Care and Family Physicians

Volume 6, Number 25 **December 11, 2000**

Common Sports Injuries: Part II

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Editor's Note—*Each year, sports injuries account for approximately 500,000 visits to the doctor.[1] Athletes who present as sports participants may be male or female, pre-adolescent, adolescent, or older. In the latter group, many of the injuries are musculoskeletal in nature. The joints most commonly involved are shoulder, ankle, and knee. This article, divided into two parts, describes the clinical presentation, examination, and intervention of several of the more common pathologies derived from sports-related injuries.*

Knee Injuries

Anatomy. The knee proper is made up of the proximal tibia and the distal femur. In addition, the patella femoral joint, which is usually considered part of the knee, is made up of the patella and its articulation with the condyles and the intercondyler notch of the distal femur.[2] The knee and patellofemoral joint will be addressed separately with regard to examination and treatment.

Biomechanics. It should be noted that the knee is not a hinge joint (i.e., it does not move in one single plane). During knee flexion in open chain (the foot is free in space), the tibia slides posteriorly on the condyles of the femur. In closed chain, during knee flexion and extension, the femur slides and rolls on the tibia. In addition, axial rotation occurs as the femur internally rotates during terminal extension, in closed chain, the tibia externally rotates during open chain.[3] Normal walking causes knee joint forces of 2-4 times the body weight, 50-100% of that of which is transmitted through the meniscus.[4] In addition, in the patella femoral joint, the patella acts as a lever for the quadriceps mechanism providing stronger knee extension. The Q angle (quadricep's angle formed by the anterior superior illiac spine, the middle of the patella, and the tibial tubercle) identifies a possible anatomic predisposition for patellofemoral problems. If this angle is greater than 20°, it is considered a predisposition to pathology (< 15-20° is considered a predisposition to pathology).[3]

Evaluation

History and Physical Exam of Knee Injuries. History is the most critical of any knee evaluation. As a matter of fact, some authors indicate that the history alone can be diagnostic 90% of the time. This is only true if the physician understands the typical mechanisms of injury and implications of acuteness vs. chronicity of the injury.[4] As with an acute ankle injury, an acute knee injury should include a complete neurovascular exam, specifically including the distal pulse. A major deformity about the knee, a pale foot, or an inability to move the foot and toes may suggest fracture or dislocation of the knee. A dislocation of the knee proper (tibia femoral joint) is an emergent condition and often requires surgery.[5]

Other than obvious deformity, inspection should focus on a specific determination of the type of swelling. Specifically, a distinction should be made between hemarthrosis and soft tissue swelling. A hemarthrosis is an intra-articular accumulation of blood. This is obviously from a highly vascular structure such as the anterior cruciate ligament (ACL). In fact, a hemarthrosis within 12-24 hours after an incident means that there is a 70% chance that there is an ACL tear. The hemarthrosis should be distinguished from soft tissue swelling, which is more likely edema and has a "water balloon" appearance. If the hemarthrosis does occur within 2-3 hours, the physician should first suspect an ACL tear, which occurs most often. Second, the physician should suspect a patellar dislocation, and an osteochondral fracture third.[4]

In the acute knee, palpation to confirm deformity is more common than palpation of specific structures to illicit pain. In fact, the entire knee may be painful, and illiciting pain from palpation is not specific.[4] The same is generally true for range of motion in the acute knee.

Several special tests can also be performed to check the integrity of the major ligaments. Specifically, the Lachman test should be performed to test the integrity of the anterior cruciate ligament.[7,8] (*See Figure 1*.[6]) In this test, the examiner stabilizes the tibia with one hand while translating the proximal tibia anteriorally with the other hand. The posterior cruciate ligament is often tested with a posterior drawer test. In this test, the examiner places the hip in approximately 45° of flexion, the knee in approximately 90° of knee flexion, and translates the tibia posteriorly with the thenar imminences of both hands on the proximal tibia and the thumbs on the joint line.[4]

The valgus stress test is performed with the patient in supine position on the table and the examiner stabilizing the lateral thigh with one hand while moving the distal tibia in a valgus direction. This tests the integrity of the medial collateral ligament (*see Figure 2*).[6] Conversely, the varus stress test done with the medial thigh stabilized while the distal tibia is forced in a varus direction tests the integrity of the lateral collateral ligament (*see Figure 3*).[4,6]

Lastly, the McMurray test tests for meniscus tears. In this test, the patient lies supine and the examiner grasps the heel of the patient's foot. Then the examiner fully flexes the knee while palpating the joint line for clicks and locks. The hip is put into external rotation to test the medial meniscus and internal rotation to test the lateral meniscus as the examiner slowly brings the leg into partial extension while performing a varus stress on the knee. The varus stress on the knee evaluates the medial compartment. To evaluate a lateral meniscus tear, the examiner applies a valgus stress on the knee while internally rotating the foot. Pain over the joint line may be indicative of a tear. Obviously, a click or clunk is also indicative of a meniscus tear.[4,8]

Perhaps the most common test of the integrity of the patella femoral joint is the apprehension test. In this test, the patella, with knee extended but in slight flexion, is displaced laterally. If the athlete becomes apprehensive about this technique, this is usually indicative of patella dislocation.[8]

Specific Injuries

Anterior Cruciate Ligament Tears

ACL tears occur most commonly in contact sports. Contact sports include football, basketball, soccer. (See Holmes CF. The Preparticipation Evaluation. *Primary Care Reports* 2000;6:189-196.)

History and Specific Physical Exam. The mechanism for an ACL tear is most commonly a rotation or pivoting of the knee with the foot planted on the ground. This usually occurs during noncontact (i.e., the most severe injury that can occur to the knee in athletics, the ACL tear is usually a noncontact injury).[4] The foot is usually planted, the knee is flexed, and the athlete suddenly changes direction, thus applying a rotational force to the knee. The same mechanism of injury can occur during contact. This usually occurs during contact to the leg as in a roll block in football. However, this occurs most commonly in non-contact environments with the foot planted.[4,9]

Physical examination includes an athlete who is limping and who usually cannot straighten his or her knee. This may be due to the ACL stump. As mentioned previously, if the hemarthrosis develops within 2-24 hours, this is also indicative of a possible ACL. All four of the previously mentioned ligaments should be tested (ACL, PCL, MCL, and LCL). There are frequently other ligament injuries with an ACL tear.[4,9]

Treatment. Early immobilization is controversial.[4] Some authors indicate that since this condition will definitely require surgery, the athlete should begin early motion and weight bearing as soon as possible. The feeling is that the athlete should go into surgery with as normal of a knee as possible. Others like to control the forces across the knee with the possible assumption that the ACL may only be partially torn. Whatever the case, the

***Primary Care Reports*™**, ISSN 1040-2497, is published biweekly by American Health Consultants, 3525 Piedmont Rd., NE, Bldg. 6, Suite 400, Atlanta, GA 30305.

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GST Registration Number: R128870672.
POSTMASTER: Send address changes to ***Primary Care Reports*™**, P.O. Box 740059, Atlanta, GA 30374.

Periodical rate postage paid at Atlanta, GA.
Back issues: $23. Missing issues will be fulfilled by Customer Service free of charge when contacted within one month of the missing issue's date.

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Subscription Prices

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$299 per year (Student/Resident rate: $150).

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In order to reveal any potential bias in this publication, we disclose that Dr. Schenck (peer reviewer) serves as a consultant to Nutramax Labs in Baltimore, Md. Dr. Holmes (author) and Drs. Gunther and Hardin (peer reviewers) report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study.

Figure 1. Lachman Test

Figure 2. Valgus Stress Test for Medial Collateral Ligament

athlete should be referred to an orthopaedist immediately. Most athletes who have this injury and want to return to sports will require surgical reconstruction. Very few athletes can return to sport without an ACL.[10] If an athlete is willing to give up the sport that caused the injury and perform only "straight-line sports," then he or she may get by without surgery.[4]

Rehabilitation. Whether postsurgical or cruciate deficient, initial treatment should focus acutely on symptom reduction, including swelling reduction and the re-establishment of normal gait. In addition, the athlete should attempt to maintain full terminal extension and gain flexion as soon as possible. Functional rehabilitation includes partial squats, stationary bike, and some type of stepper machine. Bracing has not been shown to be successful after ACL reconstruction, but some type of bracing may be necessary for the cruciate deficient knee[11] (i.e., the athlete who chose not to have the surgery). ACL tears in children are problematic. Some suggest that an ACL reconstruction should not be performed on a child until he or she reaches Tanner's developmental stage 3.[12]

Medial Collateral Injuries

Isolated medial collateral ligament injuries (MCL) and/or combination of ACL injuries are frequently seen in contact sports.[4] This is due primarily to the presence of a natural physiologic valgus at the knee. Therefore, when forces cross the knee, the medial collateral ligament is more likely to receive stress than the lateral collateral ligament. The mechanism of injury is usually valgus stress. This valgus stress could occur with a lateral blow to the side of the knee with the foot planted. If the foot is not planted, the lateral blow is not as likely to cause an MCL injury. There are three grades of sprains as defined by the amount of microtrauma that has occurred. A 1st degree is a stretch, a 2nd degree is a partial tear, and a 3rd degree is a complete tear (*see Table 1*).

The most common physical examination finding is a tender MCL. This may be at the distal insertion (proximal tibia), midsubstance, or proximal insertion of the sprain. There is also pain with forced flexion. This is because the MCL is taut during flexion. Swelling may be localized to the medial side of the knee and ecchymosis is usually obvious. There are two components to the medial collateral ligament, a superficial and a deep layer. The superficial layer is most commonly injured. As with all four ligament stress tests, as well as the McMurray's test, they should be performed to rule out concomitant and/or meniscus injury.[4]

The treatment for the majority of MCL tears is definitely nonsurgical for grades 1 and 2 sprains. A severe grade 3 sprain that is not isolated and includes other, concomitant injuries, may be a surgical candidate. However, the vast majority of MCL tears are nonsurgical.[13] Grade 1 sprains are not immobilized; however, grade 2 and 3 sprains may be immobilized for a period of 1-2 weeks. Severe grade 3 sprains may be immobilized for a short period of time; however, immobilization should be limited due to morbidity secondary to immobilization, such as decreased motion and atrophy of the quadriceps mechanism. As with the cruciate deficient knee, rehabilitation can be functional and include partial squats, a stepper machine, and/or stationary bike. Weight bearing should be performed as tolerated. As with other crutch-type activities, the primary factor in determining weight-bearing status is the normalization of gait. If the athlete does not have a normal gait, some type of ambulation assistance is needed. If the athlete has a normal gait with some verbal cueing then crutches may not be needed. This can be determined by a physical therapist and the functional rehabilitation should be performed by a physical therapist or athletic trainer.[4,14]

Prognosis is very good with isolated MCL sprains. Grade 1 and mild grade 2 MCL sprains generally return 10-14 days after injury, whereas isolated grade 3 sprains may be out for up to five weeks.[15]

The Patella Femoral Joint

Patella femoral pain or anterior knee pain syndrome is per-

Table 1. Medial Collateral Ligament Sprains—Grades Based on Microtrauma

1st degree	Stretch
2nd degree	Partial tear
3rd degree	Complete tear

Figure 3. Varus Stress Test for Lateral Collateral Ligament

haps more common than traumatic knee injures. It is more prevalent in the female population due to an increased Q angle.

History and Specific Physical Examination. Patella femoral pain does not migrate beyond the anterior aspect of the knee and is usually chronic in nature with a history of insidious onset. Patella femoral pain is a common presentation in adolescent athletes. Inspection may indicate mild effusion but more often does not. The peri-patella region may be point tender to palpation. Often, a medial plica is also inflamed, thus making the medial aspect of the peri-patella region even more sensitive. While range of motion may not be affected, strength may be affected. Observation and strength testing of the quadriceps muscles should indicate atrophy present when compared side to side. Special tests include the apprehension test, which is positive for possible chronic subluxation events or dislocation. In addition, compression of the patella while the athlete performs flexion and extension may elicit crepitus at the patella femoral joint. This has classically been indicative of patella femoral arthralgia but may also be indicative of general inflammation.[18]

Treatment acutely includes nonsteroidal anti-inflammatory drugs (NSAIDS); however, a specific rehabilitation program is essential to return the athlete to his or her activity. Rehabilitation should focus on quadricep strengthening. This may include exercises, such as partial squats, short arc quads, straight-leg raises, and stationary bike (with the seat high to decrease total knee flexion). In addition, aquatic therapy is often helpful with these patients. While the patient returns to activity, the water creates an environment where the patient can mimic sports activities in a setting with diminished forces. A physical therapist or athletic trainer should direct the rehabilitation program.[16]

Patellar Tendonitis

History and Specific Physical Examination. There is no actual mechanism of injury, and history reveals insidious onset of pain. Physical exam should reveal point tenderness at or just distal to the inferior pole of the patella along the patella tendon. Other than this finding and the history of insidious onset, there are no obvious dysfunctions (i.e., there is usually no limitation in range of motion, strength, etc).[4]

Treatment. NSAIDS are helpful; however, they may not be an effective treatment. Rehabilitation should be very similar to anterior knee pain syndrome and should be very specific to strengthening of the quadriceps mechanism while performing functional activities. As with other rehabilitation programs, this should be directed by a physical therapist or an athletic trainer.[4,16]

Radiographs

As with the ankle for acute injuries, Ottawa Rules can be followed (*see Table 2*).[16]

Decision Rule for Radiography in Acute Knee Injuries

A knee examination is required for acute knee injury in patients with one or more of these findings related to age, tenderness, or function (*see Table 2*).[16]

Ottawa Rules have been put in place in emergency rooms and have improved specificity related to prescription of radiographs and the presence of fracture. Specifically at the knee, this has been done because approximately 1.3 million patients present annually in ER departments with acute knee trauma; however, only an estimated 6% of those patients have suffered fracture.[17] Ottawa Rules notwithstanding, most athletic injuries to the knee will meet this criteria (i.e., for example an ACL or MCL injury to the knee will many times be painful in weight bearing). The athlete will not have been able to continue to participate in athletics. Therefore, these criteria will have been met and a radiograph will be obtained. These criteria may not be met for chronic knee injuries. For chronic knee pain, radiographs can be used in this instance to assess joint space narrowing, specifically to assist patella femoral alignment or the possibility of malalignment. In addition, osteochondritis, desecans, loose bodies, cysts, and rare tumors can also be ruled out.[4] Three views are commonly taken: a bilateral standing position to assess patella femoral alignment should be done in weight-bearing position at a 45° angle of flexion; second, a lateral view at 60° of flexion; and third, a merchant view of the patella at 30° of flexion. The posterio-anterior view can provide a view of the femoral notch, which should be evaluated when cruciate injury is suspected for a possible cru-

Table 2. Ottawa Knee Rules

- Age 55 years or older; or
- Tenderness at head of fibula; or
- Isolated tenderness of the patella (no bone tenderness of knee other than patella); or
- Inability to flex to 90°; or
- Inability to bear weight both immediately for four steps; or
- Unable to transfer weight twice onto each lower limb regardless of limping.

Adapted from: Wexler RK. The injured ankle. *Am Fam Physician* 1998;57(3)474-480.

Table 2. Shoulder vs. Cervical Region Pathology

Cervical Region	Shoulder
Pain at rest	Pain with use
Pain with neck motion	Pain working overhead
Pain with pressure on neck	Feeling of instability
Aggravated by postural positions	Local palpable tenderness
Pain distal to shoulder	Pain in deltoid region
Reflex changes	Pain mainly on dominant side
Altered peripheral sensation	Relief with local injection
Decreased cervical spine motion	

Adapted from: Zachazewski JE, Quillen WS, eds. *Athletic Injuries and Rehabilitation.* Philadelphia, Pa: WB Saunders Company; 1996.

ciate evultion fracture. The lateral view can be used to assess tibia femoral alignment when possible significant knee injuries are suspected to rule out a tibia femoral dislocation. In chronic knee injuries, this can also be used to identify tibia "ossicles and fractures." A merchant view assesses patella femoral joint space and alignment.[4]

Shoulder

Anatomy/Biomechanics. The shoulder complex is made up of three bones and four articulations. The bones are the clavicle, scapula, and humerus. The four articulations are the sternoclavicular joint, the scapulothoracic articulation, the acromioclavicular joint, and the glenohumeral joint.[2] It is important to note that during glenohumeral movement, particularly flexion or abduction, moving the hand into an overhead position, that rotation of the clavicle occurs. This motion occurs at the sternoclavicular joint. In addition, there is an arthrokinematic sliding that occurs at the acromioclavicular joint as the scapula raises and rotates on the clavicle. The arthrokinematic motion of the glenohumeral joint is as follows: the head of the humerus rolls upward during abduction or flexion and at the same time slides downward. Suffice it to say that for normal shoulder motion to occur, normal motion is required at all four articulations.[3]

For this motion to occur, two force couples occur that use muscles of both the rotator cuff and the scapula stabilizers. The muscles of the rotator cuff are as follows: supraspinatus, which has a direct pull to abduct at the shoulder, infraspinatus, teres minor, and subscapularis, which all have the ability to pull the humerus down, thus causing the sliding down during abduction. In addition during abduction, the rhomboids, the middle and lower trapezius, and the deltoid rotate the scapula laterally.[3]

One other clinically significant anatomical consideration is the coracoracromial arch, which is made up of the coracoracromial ligament along with the acromion. This arch makes up the roof of the lateral aspect of the shoulder, an area that is "implicated in some acromial impingement."[18] The supraspinatus tendon arises from the head of the humerus and dives toward the scapula in this arch in addition to overlying the supraspinatus tendon.[2] Also, the subaccromial/subdeltoid bursa is under the arch.[2] Both of these structures along with the biceps tendon are commonly "impinged." For this reason, both spurpraspinatus tendonitis and bicep tendonitis fall under the general umbrella of impingement.

History and Physical Examination: General Considerations. Perhaps the most critical factor when performing a history is to rule out concomitant cervical spine dysfunction. In order to do this, a cervical spine exam must be performed. This should include a dermatome and myotome check and also should include active range of motion. For example, painful active range of motion of the cervical spine might indicate a component of cervical spine dysfunction in addition to shoulder pathology. Other findings specific to cervical spine dysfunction would be decreased reflexes, and possibly a positive cervical compression test.[18] In addition, cervical spine pain could radiate along the C-5, C-6 dermatome, a common site of cervical spine dysfunction.[19] Pain above the glenohumeral joint (e.g., in upper trapezius or levator trigger points) could be indicative of either cervical spine or shoulder pathology (*see Table 3*).[19] Table 3 has identified some clinical features of cervical spine pathology vs. shoulder pathology.

General Considerations of Physical Examination. Inspection of the shoulder should include the presence or absence of atrophy of the rotator cuff musculature and an evaluation of cervical spine posture. For example, the classic forward head posture may be indicative of cervical spine as a contributing factor to shoulder pain. Active range of motion should include overhead motion such as flexion and abduction. In addition, extension and external and internal rotation should be performed actively. Both quantity and quality of motion should be evaluated, and a patient's report of pain should be noted during range of motion as well. Strength testing is critical in the shoulder. Quite often, strength is limited secondary to pain. With shoulder conditions, strength testing should be done. A gross strength test should include abduction at 90°, flexion at 90°, and should include isometric testing performed in the following

Figure 4. Shoulder Instability Spectrum

Vague Sense of Shoulder Dysfunction

(**A**traumatic **M**ultidirectional Instability in **B**oth Shoulders that responds to Intensive Rehabilitation. If surgery necessary, Inferior Capsular Shift Used [**AMBRI**])

⇓

Repetitive Microtrauma

⇓

Subluxation (Voluntary/Involuntary)

⇓

Frank Disclocation
(Trauma)

(**T**raumatic, **U**nidirectional **I**nstability with **B**ankart Lesion Requiring **S**urgery [**TUBS**])

positions: abduction at 90°, flexion at 90°, internal and external rotation with the arm at the side and the elbow at 90°. In addition, test strength in the "plane of the scapula."[3] This is the actual plane in which the the glunohumeral joint functions, and it is as follows: abduction to 90° then horizontal abduction of 30°. Pain in this plane may specifically be indicative of impingement. In addition, a specific, acute neurovascular exam including a dermatome and myotome check of the entire upper extremity should be performed.

Impingement

Impingement is a general term that is inclusive of several distinct clinical entities. Some of these clinical entities include supraspinatus tendonitis, subaccromial/subdeltoid bursitis, and biceps tendonitis. These conditions have been generally labeled impingement because the mechanism of injury (chronic overhead motion) is the same for all three conditions. When considering the general history of the shoulder patient, there should be attention paid to onset. While it is possible to have acute impingement, insidious onset of pain is much more common as a presentation. The specific mechanism of injury for impingement is chronic overhead motion. This is a common condition seen in throwers; specifically, the serve in volleyball, the throw in baseball, or the throw in football have been commonly implicated. Physical exam (PE) findings include point tenderness in the subacromial region and/or over the biceps tendon, a painful arc during active range of motion-abduction. In addition, conservative treatment is similar. Impingement may not present with any abnormal findings under inspection. Palpation may reveal point tenderness in the subacromial region and/or across the biceps tendon. Range of motion again may not present with abnormal findings with regard to quantity of motion (i.e., the athlete will be able to perform range of motion through the full range), but the subtle qualities in motion may be present. For example, during abduction the athlete may have a "hitch" somewhere in the range of 70-100°. This is called a painful arc and is indicative of some form of impingement.[8] Strength, tested as previously described, may be positive. Again, the strength limitation will be subtle if impingement is present, and this may occur during resistive abduction or resisted external rotation, and resistance in the plane of the scapula.[18]

Several special tests have been described for different types of impingement. Perhaps the most common is the Jobe position, or the empty can test.[18] In this test, the athlete places his or her arm in the plane of the scapula, then severe internal rotation occurs (i.e., the athlete is described as emptying a can with his or her hand). Resistance is then applied about the forearm. If this is painful, it is specifically indicative of supraspinatus involvement. Other impingement tests have been described. Two that are very common are the Neer impingement test and the Hawkins-Kennedy impingement test.[18-20] In the Neer impingement test, the athlete goes into full flexion. Then the examiner places one hand behind the shoulder and the other hand at the elbow and forces the arm further into flexion. Pain in the shoulder is indicative of impingement.[19] In the Hawkins-Kennedy impingement test, the athlete again places his or her arm in the plane of the scapula. At this point, severe internal rotation is applied with resistance. Again, pain in the subacromial region in this instance is also indicative of impingement. The most common special test used for biceps tendonitis is the speed test.[19] In this test, the athlete places his or her arm at 90° of shoulder flexion with the elbow fully extended. At this point, resisted flexion occurs. The elbow is fully extended and the arm is externally rotated. At this point, the palm is facing upward and the athlete attempts to push the palm further upward while the examiner forces the arm down. Pain in the anterior aspect of the shoulder is indicative of biceps tendonitis.[19,20]

Special Tests Related to Instability. Instability is much more difficult to evaluate specifically relative to special tests. The most commonly used special test is called the anterior apprehension test. In this test, the athlete lays supine and the examiner places the arm in 90° of abduction and full external rotation. If anterior instability is present, the athlete will usually be apprehensive about putting the arm in this position.[8] In addition, in evaluating general instability, the examiner should again lay the athlete in supine position and then mobilize the humerus by sliding the head of the humerus near the joint line anteriorly and posteriorly, visualizing specific movement and end points. This should be compared to the other side.[19]

Treatment

Treatment, obviously acutely, initially includes NSAIDS—perhaps the most common followed by physical agents. Ice and heat are both used at this time. Since there is possible anatomic predisposition to impingement and if this condition does not resolve initially, it should be referred to an orthopedist. Acutely, the exercise that is most commonly given is the pendulum, or Codman's, exercise. In this exercise, the athlete bends forward and hangs the arm loosely at a 90° angle. At this point, the athlete swings the trunk causing the arm to swing in a pendelum motion or in a circular motion beginning with small circles and progressing to bigger circles. This exercise should be

done 3-5 times a day for 2-3 minutes. This exercise allows blood flow to the impinged regions to improve and perhaps allows healing to occur.

Impingement requires a consistent rehabilitation program that should be performed by a physical therapist or athletic trainer. Strengthening exercises acutely should target both the rotator cuff and the scapula stabilizers, which have more recently been implicated as a possible source of abnormal biomechanics leading to impingement.[19] Initially, exercises will be performed isometrically and later performed isotonically. As mentioned previously, exercises such as the Codman's and other range-of-motion exercises are critical in both the prevention and rehabilitation of these conditions. In fact, Codman's should be performed as a warm-up and cool-down exercise in all throwing athletes.

The last phase of rehabilitation is always return to activity. When dealing with a throwing athlete, this should be done in a very gradual manner, again supervised by a physical therapist or athletic trainer.[14]

The last phase of any rehabilitation is return to activity, and should include a functional throwing program for any throwing athlete. For example, a baseball player who wants to get back to the overhead throwing motion after impingement should first start by tossing the ball a few feet with the therapist. This should be followed by tosses of increasing length. Possibly starting as low as 10 ft and progressing out to 100 ft. At some point, the athlete will start to progress in terms of velocity and instead of tossing, begin throwing. All of this is guarded by pain. If, at any point, the athlete begins to experience pain, then he or she should go back to the previous stage and stay there until the pain subsides. Usually the throwing program does not have to be discontinued, but a regression to the previous step will suffice. This progression continues until the athlete is back throwing at the level he or she wants to throw. If the athlete is a pitcher, the last step is obviously to pitch off the mound.[21]

Instability

Instability is a complex condition that many feel occurs along a continuum.[22] For example, it can present as only a general sense of shoulder instability (*see Figure 4*)[19] all the way to traumatic dislocation. There are three basic classifications of instability. They are traumatic, a-traumatic, and acquired.[23] Traumatic dislocation has a definite mechanism of injury that usually includes abduction and external rotation with applied force to the shoulder, thus resulting in the humeral head dislocating anteriorly. A frank dislocation usually presents at the emergency room and is easily identified. PE findings include dislocation on radiograph and obvious deformity of the glenohumeral joint. An a-traumatic dislocation can occur with athletes with what some would call general hypermobility—those who have instability in multiple directions.[19] The history of the patient with acquired instability may include multiple instances of reported shoulder dislocation quite often with self-reduction.[19]

PE Findings may include atrophy of the deltoid rotator cuff muscles and/or scapula stabilizers. Point tenderness can occur in the anterior or the posterior aspect of the shoulder, and there may or may not be an active range of motion limitation, depending on whether the athlete presents acutely.

Acquired instability is a condition in which the history of the athlete usually includes swimming, gymnastics, baseball, and pitching.[19] Theoretically, there is a chronic repetitive microtrauma that occurs, thus causing this acquired instability. The athlete's shoulder becomes extremely mobile and this may be a precursor to a traumatic dislocation. However, this athlete may present with only a vague sense of instability and, more commonly, this athlete will present with a vague sense of instability. PE findings would be similar to those of a-traumatic instability. Again, all instability may occur along a continuum. Both a-traumatic instability and acquired instability may have a positive apprehension test. The most commonly used special test is called the anterior apprehension test. In this test, the athlete lies supine and the examiner places the arm in 90° of abduction and full external rotation. If anterior instability is present, the athlete will usually be apprehensive about putting the arm in this position.[8]

Instability is a very complex clinical entity and should usually be referred to a sports medicine orthopedist for further evaluation. Nonsurgical rehabilitation, however, is often successful in these patients. Rehabilitation is similar to that described under impingement, with a focus on rotator cuff strengthening and scapular stabilizers strengthening. However, when subluxations or dislocations occur more than once, the athlete should be referred to an orthopedist.

Acromioclavicular Joint

Perhaps one of the most common injuries in contact sports, particularly football, is the AC sprain.

History. AC sprains usually occur because of a direct fall on the "point of the shoulder," thus driving the clavicle upward. There are basically three types of AC sprains, although some divide type 3 into three subgroups: grade 1 usually includes minimal damage, usually to the AC ligament. PE will include local tenderness in palpation. The patient may have a loss in range of motion in grade 1 stress and x-rays are usually normal. This is the most common AC sprain. In a grade 2 AC sprain, there is an additional injury to the acromioclavicular capsule, and the acomioclavicular and corococlavicular ligaments. This is evident as the clavicle is raised on inspection and there is a separation at the AC joint on stress x-ray. Grade 3 includes significant injury to the capsule in addition to the acromioclavicular and the corococlavicular ligament. While grade 1 and 2 may be treated conservatively, grade 3 may be treated surgically. There is usually significant deformity with the end of the clavicle displaced superiorly. A grade 1 should cause very little loss of time to athletic participation; however, a grade 2 may include some period of healing—possibly up to six weeks. Both grade 1 and 2 respond well to traditional rehabilitation efforts including physical agents and strengthening exercises.[19]

Summary

Common sports injuries include ankle sprains, knee injuries, impingement, instability, and AC sprains of the shoulder. All of these injuries require a physician who understands that the ultimate goal is usually to go back to the activity that caused the injury in the first place—the chosen sport. Knowledge regarding examination, initial treatment, and rehabilitation will aid the athlete in reaching his or her goal.

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Physician CME Questions

62. A Q-angle is considered a predisposition to pathology when it:
    a. is less than 15-20°.
    b. is 30-40°.
    c. 5°.
    d. None of the above

63. A 3rd degree medial collateral ligament sprain based on microtrauma is a:
    a. partial tear.
    b. complete tear.
    c. stretch.
    d. None of the above

64. When examining for acute knee injury, which of the following Ottowa Knee Rules must apply?
    a. Ability to flex and go
    b. Unable to transfer weight twice onto each lower limb regardless of limping
    c. Bone tenderness of the knee
    d. Ability to bear weight in both immediately for four steps

65. Which of the following is part of the makeup of the shoulder complex?
    a. Lateral collateral ligament
    b. Proximal tibia
    c. Humerus
    d. Patella

66. Which of the following clinical entities are inclusive to the term impingement?
    a. Supraspinatus tendonitis
    b. Subacromial/subdeltoid bursitis
    c. Biceps tendonitis
    d. All of the above

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