Easily Missed Lower Limb Sports Injuries

Dr. Hok-ming HO

MBChB(CUHK), FCSHK, FRCS (Edin), FHKCOS, FRCSEd(Orth), FHKAM(Orth.Surg), MScSMHS (CUHK)

Associate Consultant, Division of Sports & Arthroscopic Surgery, Department of Orthopaedics & Traumatology, Tseung Kwan O Hospital

Chapter President 2009-2010, Hong Kong Orthopaedic Association - Sports Medicine Chapter

With the effects of 2008 Beijing Olympic Games, there has been a progressive growing of importance of sports at all ages. The widespread popularity of sports among the general public recruits more and more people to enjoy participating in a great variety of sports as a source of recreational or professional activities. On one hand, when people who have few opportunities to engage in sports suddenly take part in these functions without sufficient preparation and training, many different kinds of injuries or disorders can occur. On the other hand, those who have already enjoyed in athletic sports and are playing at a higher level can also suffer from a series of potential musculoskeletal problems.

Among all sorts of sports injuries, lower limb injuries are the most common sites of the body affected. In 1998, ML Leung from Hong Kong Baptist University reported that 52% of their 514 samples were lower limb injuries\(^1\). In another study conducted in Tseung Kwan O & Sai Kung in 2008, nearly 60% of their secondary school students had at least one instance of lower limb sport injuries in the past year \(^12\).

**Missed ACL Injury**

**Introduction**

The knee joint is the central weight-bearing joint of the lower limb, where various types of injuries and disorders can be caused by sports activities. They include anterior / posterior cruciate ligament injury, medial / lateral collateral ligament injury, meniscal injury, articular cartilage injury, acute / recurrent patellar dislocation / subluxation and a number of chronic or recurrent conditions such as overuse syndrome. An accurate differential diagnosis of each injury is paramount for the proper care of a patient as well as the ultimate goal of rehabilitation \(^3\).

Injury to the anterior cruciate ligament is the most widely known sport injury, where the healing mechanism hardly works \(^1\). Many cases of this injury require surgical treatment due to the persistent recurrent instability which greatly affects athletes in their sport performances and sometimes even daily life \(^4\).

**Why It Is Easily Missed**

The injury can be missed at the acute, subacute or chronic stages. In the acute stage, patients usually come to the clinic with a limping gait and a painful swollen knee. History sometimes cannot provide any clue. Due to the pain and swelling, good muscle relaxation is often difficult. Therefore, correct physical signs cannot be elicited easily.

In the subacute stage, patients may seek medical attention a few days or weeks later. They may have already received a course of conservative management by themselves or commonly in Hong Kong by a bone setter. As there is a prolonged period of knee immobilisation, the stiffness of the knee may mask the true laxity. Any forceful manipulation of this type of knee can induce reflex muscle contraction. Thus, this can reduce the chance of accurate clinical assessment. Moreover, a plain X-ray of an isolated ACL injury usually gives no gross bony lesion.

Basically, isolated chronic ACL deficiency causes no pain at all. It is only when complications appear, and then the patients may have symptoms such as pain, swelling, locking or even giving way \(^6\). Therefore, in the chronic or recurrent stage, patients usually come to the clinic for painful complications of chronic ACL deficiency rather than knee instability alone. This may distract the clinician’s point of concentration upon physical examination. Furthermore, apprehension of anticipation of knee pain can prevent the patient from adequate relaxation and minimise the sensitivity of the ACL test. In addition, there is often residual ACL scar or stump bridging across the knee joint contributing partial anterior-posterior translation constraint upon testing. Besides, radiological investigation of chronic ACL deficiency can be essentially normal as well. Subtle early degenerative changes of the knee can be detected only in cases of associated major meniscal tears or secondary cartilage damage.

**Diagnostic Pearls**

To minimise the chance of missing an ACL injury, a detailed history and careful physical examination with appropriate investigations can safeguard our patients’ care.

Classical acute ACL injury occurs through non-contact type of sports injuries during jumping, landing or quick turning with mid-range of knee flexion. It also occurs when the knee is excessively rotated during a landing while playing football or basketball. Up to 50% of patients may hear a subjective “pop” sound when they are injured. The pain, which gradually increases after the injury, is often severe enough to force most athletes to quit the game. They usually obtain medical advice on the same or following day. Throughout follow-up, the
pain is largely relieved to the point where the patient has no trouble in most of his daily life, but it is difficult to resume sports activities because of the knee instability. If the athletes continue their sport activities, re-injuries will mostly occur and can cause a combined injury of the meniscus and even articular cartilage.

Since most patients experience the classical injury mechanism, a detailed interview about the mechanism and history of symptoms will often be helpful in its diagnosis. In most acute injuries, the severe haemarthrosis can be frequently seen. Actually, from clinical literatures, 70% of haemarthrosis can be associated with ACL injuries. 20

The most sensitive clinical examination is the anterior drawer test with knee flexion at about 20 to 30 degrees (Lachman's test). The results are positive in most cases of injury. However, in acute cases, owing to gross swelling and pain, involuntary muscle contraction can indirectly give a negative Lachman's test. Repeated examinations after acute swelling and pain have subsided are highly recommended. The other commonly used clinical tool is the anterior drawer test with knee flexion at 90 degree (Anterior drawer test). Unfortunately, it is not always possible to have our patient's knee bended to 90 degree in the acute or subacute stage. The pivot shift test is also an important clinical examination that aims to reproduce the functional rotatory instability. 8, 9 In correct pivot shift test, axial load together with valgus and internal rotation is applied to the fully extended knee, and then the knee is passively flexed. If the ACL deficiency is serious, this will induce tibial anterior and internal rotatory subluxation. 21 A rapid tibial reduction can be achieved with knee flexion. Again, to achieve positive pivot shift test, the patient has to have a pain-free knee and good relaxation of the muscle. To some extent, the grade of the pivot shift test correlates with the clinical functional symptoms of our patients. The majority of our ACL deficiency patients can be diagnosed from a clinical assessment. A MRI and results are positive in most cases associated with ACL injuries. 20

Meniscal injuries can also be missed easily at both the early and late stages. In the early stages, the painful and swollen knee cannot allow for a correct physical examination. In the late stages, patients complain of residual on and off knee pain. However, it is rather non-specific ranging from resting mild discomfort to pain upon exertion.

Missed Meniscal Injury

Introduction

The meniscus is a fibrous cartilage tissue located between the femur and tibia in the knee joint. 10 It is associated with local transmission, shock absorption and stability of the joint.

Meniscal injuries frequently occur particularly among young people during sport activities.

The mechanism of meniscal injuries can be considered as a combination of flexion and rotation of the knee. In young people, these combined forces are frequently generated in most sports activities. In middle-aged and elderly people with co-existing degenerated knee joints, minor injuries or undetectably slight external forces may give rise to meniscal tears. In addition, meniscal injuries are associated with anterior cruciate ligament injuries. Most patients complain of instability from ACL insufficiency and pain due to meniscal injuries. Major neglected meniscal tears cannot heal by themselves and can progress to displaced fragments and result in "locking" in which full extension of the knee joint is impossible.

Why It Is Easily Missed

Meniscal injuries can also be missed easily at both the early and late stages. In the early stages, the painful and swollen knee cannot allow for a correct physical examination. In the late stages, patients complain of residual on and off knee pain. However, it is rather non-specific ranging from resting mild discomfort to pain upon exertion.

Diagnostic Pearls

A high clinical suspicion is important for diagnosis of meniscal tears. Any persistent knee pain after sport activities in young athletes or a minor sprain to a degenerative knee should undergo detailed clinical examination. Mild quadriceps wasting and mild to moderate effusion are highly suggestive of possible meniscal injuries. We find that local tenderness along the respective painful joint line is a consistent and reliable physical sign suggestive of meniscal tear. The McMurray test is a specific but relative low sensitive test and a MRI is both highly sensitive and specific for the diagnosis of meniscal tears.

Early referral to an orthopaedic surgeon is necessary as 50% of meniscal tears are amenable to surgical repair. Any nonunion meniscal tear is prone to displacement and results in locking of the knee. The majority of repairs can be done via the arthroscopic technique with use of one to two stab wounds. 2 The overall union rate after successful repairs can be up to 70% in an isolated repair and over 90% in combined ACL reconstruction operations. 22

Missed Closed Rupture of Achilles Tendon

Introduction

The Achilles tendon is the largest tendon in the human body and ruptures due to sudden contraction of the gastrocnemius muscle. In younger patients, blood flow disturbance induces interstitial tears and overt rupture in the hypovascular zone. 16 In middle-aged population, Achilles tendinitis is a common cause due to degeneration of the tendon and inadequate warming up. 12, 13 This condition is generally associated with volleyball, basketball, gymnastics, tennis and especially badminton in our locality, in which repeated jumping, landing, forceful forward / backward stepping and cutting motions are routine movements. 19 Patients often describe the sensation at the movement of rupture as...
being “kicked from behind” and usually hear a rupturing “pop” sound or feel a popping sensation at their heel.

Why It Is Easily Missed

Closed rupture of the Achilles tendon can be unnoticed at both acute and chronic cases. Remarkably, up to 25% of Achilles tendon ruptures have been missed completely on clinical examination. At acute stages, pain is mild in most cases particularly for those athletes who have history of pre-existing tendinitis. Most patients can still walk flat-footed to your clinic. However, they cannot tiptoe.

In acute partial tear cases, a gap may not be clearly felt at the ruptured site. In chronic cases, patients seek medical advices for weakness upon sudden and quick propelling rather than heel pain. This can greatly mislead the attention of the attending doctor. At the same time, the ruptured site may have already been covered by fibrous tissues. In both situations, radiological investigations of the heel and ankle are often normal.

Missed closed rupture of the Achilles tendon at an early stage can progress the partial tear into a complete tear and lose the golden time for primary surgical repair. Missed rupture cases in the late stage can greatly retard the potential restoration of the normal ankle plantar flexion thrust.

Diagnostic Pearls

To avoid missing the correct diagnosis of closed rupture of the Achilles tendon, careful taking of the patient’s history is essential. Prodromal symptoms of on and off heel pain after exertion may uncover the story of tendinitis. Asking the patient to try tiptoe is crucial for early diagnosis. When the calf is grasped with the knee joint flexed at 90 degrees in a prone position, the ankle joint normally flexes, but this does not occur with a ruptured Achilles tendon (Thompson’s squeeze test).

Early referral to an orthopaedic surgeon is recommended for both acute and chronic cases in order to restore the overall functional recovery of the ankles. In the acute stage, primary surgical repair is preferred when treating younger and more athletic patients and those in whom adequate tendon apposition is not obtained through closed means. The recent literature has suggested that early gradual return to function after surgical repair is effective and may not increase the rate of rerupture.

References


12. Ho HM, Lau WSV: Health promotion project on prevention of knee injury in sports activities ‘熱身運動做一做，遠離膝傷做得到’ (Project No.: 20060154) funded by Health Care and Promotion Fund for Non-Research Health Promotion Projects, HKSAR.


17. Leung ML: More sporty, less risky. 1998; HKSDR research department.


