



Ouch! My Knee Hurts!

Understanding Sports Knee Injuries

For avid football fans, we have witnessed a number of famous players go down with serious knee injuries while playing the game over the years. One of the more prominent injuries was suffered by Liverpool's Virgil Van Dijk during a English Premier League match against Everton in 2020. Van Dijk fell to the ground clutching his knee in anguish following a tackle by Everton goalkeeper Jordan Pickford. Before the official announcement of the diagnosis, there were already countless curious netizens who speculated on his exact knee injury. Their guesses ranged from soft tissue injury to bone fracture. Van Dijk was subsequently diagnosed with an anterior cruciate ligament (ACL) injury and he underwent surgery before returning to elite sports.

Knee injuries count among the most common of sports injuries. It is a common sight to see athletes go down, grasping their knees in pain, especially during contact sports. Knee injuries can involve trauma to different parts of the knee, including bones, muscles, tendons (tissues that attach muscles to bones which allow the muscles to function), ligaments (tissues that hold a joint to provide stability), menisci (a shock absorber) and cartilages (tissues that line the knee joint to allow gliding)

(see Figure 1). Soft tissue injuries (ligament, meniscus, cartilage, tendon, muscle) are more common compared to bone injuries.

Sports knee injuries can be acute or chronic in nature. Acute sports knee injuries can involve direct trauma from a forceful impact, such as a fall, twisting or pivoting injury. Chronic injuries usually arise from overuse, including repetitive strain of the joint, muscles or tendons.

Common sports knee injuries include tears of the ACL, meniscus and cartilage injuries. ACL and meniscus injuries are common in contact sports that involve a rapid change of direction, such as rugby, basketball, football, netball, softball and martial arts (including judo, jiu-jitsu, taekwondo, kickboxing, karate and



Figure 1: Different components of the knee joint (Figure extracted from orthoInfo from the American Academy of Orthopaedic Surgeons)

mixed martial arts). During these activities, the knee twists (see Figure 2) and over-extends beyond its limits (hyperextension).

Sports such as gymnastics, basketball, netball, pole vaulting and tennis, which involve a lot of jumping, can result in Jumper's knee or Patellar tendinitis; while sports that may result in overloading on the knee joint, such as biking, skiing, weightlifting, marathon and hiking, can cause Runner's knee or patellofemoral pain syndrome. On the other hand, repetitive high impact loading activities, such as running, can result in degenerative meniscus and cartilage injuries as well.

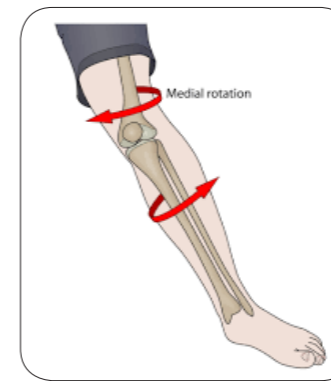


Figure 2: Twisting of the knee during sports injury (Photo credit: www.centralperformance.com.au)

EARLY/IMMEDIATE MEDICAL TREATMENT

Knee pain and swelling should not be ignored. In most cases, strains, sprains and tendinitis of muscles and tendons can be observed. The following are common sports injuries that will benefit from early medical treatment.

1. A "locked" knee

Difficulty in bending or straightening the knee could represent a locked knee. A locked knee is an orthopaedic condition that requires early treatment. It usually results from a mechanical obstruction within the joint, such as a dislodged meniscus tear, or cartilage/osteochondral (cartilage with bone) loose bodies. Thus, a locked knee is suggestive of meniscus, cartilage and/or ligament injuries.

A locked knee usually arises as a result of a twisting and pivoting injury during sports. An appropriate clinical evaluation is important to lead a clinician to the diagnosis. Early imaging, such as an MRI scan, would be essential in evaluating these injuries. Meniscus tears and cartilage injuries are potentially repairable, and the mechanical block to obstruction can be resolved.

2. Kneecap (Patella) dislocation

This condition happens when the kneecap pops out of its usual location in the front of the knee to the outer side of the knee (see Figure 3). It can happen from twisting of the knee or from direct impact from the outer side of the knee. The injury results in pain, swelling and deformity of the kneecap.



A Original position of the knee cap
B Current abnormal dislocated position of the knee cap on outer side of the knee

Figure 3: Dislocated kneecap (patella)

The kneecap often returns to its normal position on its own. However, sometimes, it needs to be carefully pushed back by the doctor in the emergency department under sedation. A knee brace or cast might be needed for a short period of immobilisation. Seeking immediate care is essential to avoid further damage to the knee. Further MRI imaging may also be needed to assess the extent of the damage to the ligament, bone and cartilage. Recurrent dislocations of the kneecap might require surgical intervention.

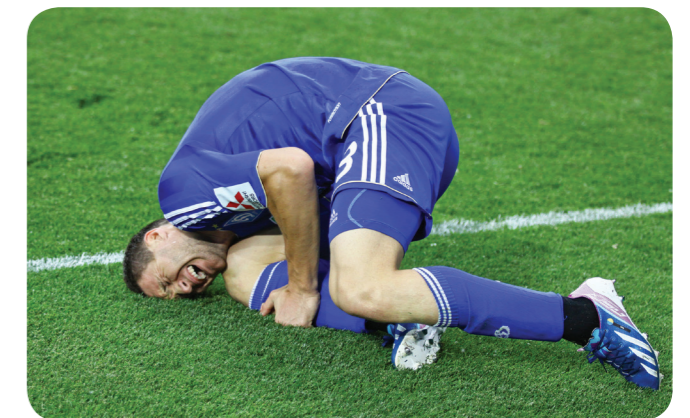
3. The unstable knee

A history of immediate swelling or a "pop" sound heard during an injury can be associated with potential knee instability. After the injury, if the knee continues to buckle ("give way") and a physical examination of the knee suggests laxity, the most common cause is usually an ACL injury. Unfortunately, knee instability can potentially result in further injuries to the meniscus and cartilage in the knee. The presence of a meniscus tear can exacerbate instability of the knee.

During physical examination, pain on the joint line and pain on bending could raise the suspicion of a meniscus injury. Diagnosis of knee ligament and meniscus injuries is crucial to determine the type of treatment required. Ligaments can be surgically reconstructed in individuals who are keen to return to sporting activities. Many times, ligamentous and meniscus injuries can occur at the same time. Ligament reconstruction and repair of meniscus is usually performed simultaneously in the same surgical setting.

4. Fractures of the knee

Although less common, fractures can occur in high-energy contact sports. In the recent 2021-2022 English Premier League season, we witnessed a couple of players go down with knee injuries. One of the more prominent injuries was suffered by Leeds United's Stuart Dallas. He sustained a knee injury after a collision with Manchester City's Jack Grealish. Dallas was eventually diagnosed to have sustained a femur (thigh bone) fracture. The lower part of the femur bone makes up the top part of the knee joint.



Fractures can also occur at the lower part of the knee joint, which is the tibia (shin) bone or the patella (kneecap). With fractures of the knee, the athlete would have difficulties in moving the knee and putting weight to ambulate. There would be severe pain and swelling with a possible deformed appearance of the knee due to the fractured bone pieces. Immediate medical

attention should be sought and X-rays must be performed to evaluate these injuries. Some fractures can be treated with a cast, but most fractures around the knee would require surgical intervention to stabilise the fractures.

OTHER COMMON KNEE INJURIES

Jumper's knee or Runner's knee are non-medical terms often used to describe pain at the front of the knee. These symptoms are usually associated with running and jumping sports. Runner's knee involves pain at the front of the knee and around the patella (kneecap). It is a common name for patellofemoral pain syndrome. This injury is caused by pain from abnormal contact and movement of the patella gliding over the femur. On the other hand, Jumper's knee is known as patellar tendinitis, which is inflammation of the patellar tendon. This condition occurs when individuals suddenly subject their knees to more stress during exercises ("weekend warriors"), or train on hard surfaces.

Risk factors for such injuries can be split into internal and external factors. Internal risk factors comprise the internal traits and conditions of an athlete, such as sex, age, body condition, prior injuries and stamina; while external risk factors encompass elements such as intensity of the sports, type of sports and playing environment. The risk factors mentioned are non-exhaustive.

In the majority of these cases, a non-surgical approach is used. As the old adage goes, "prevention is better than cure". To prevent such injuries, it is essential to reduce training errors, avoid overuse, overtraining of the knee and maintain flexibility of the knee joint.

NON-SURGICAL TREATMENT

Non-surgical treatment usually involves rest, symptomatic management and physiotherapy. Patients are advised to refrain from sports and activities to avoid repetitive stress on the knee. Analgesics are usually provided for pain relief; while anti-inflammatory drugs are effective in reducing inflammation and pain. Physiotherapy would be important to strengthen the muscles supporting the knee joint, build up the knee's strength and restore range of motion. The use of knee tape, knee strap or knee brace may also be recommended to provide extra support and analgesia.

Shockwave therapy is another form of non-surgical treatment. It utilises high-energy acoustic waves to reduce pain and assist with the healing process (see Figure 4). Some clinicians might also offer therapeutic injections to the painful knee, such as cortisone injection, to reduce inflammation and pain. Platelet-rich plasma (see Figures 5a and 5b) and stem cell injections



Figure 4: Shockwave therapy delivered in a non-invasive manner via a handpiece

(see Figures 6a and 6b) are also sometimes used. These can potentially help in the repair of damaged tissues.



Figure 5a: Centrifugation of a patient's blood



Figure 5b: Platelet rich plasma-concentration of a patient's platelets after centrifugation

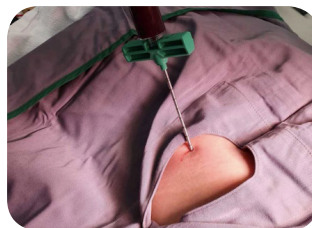


Figure 6a: Retrieval of stem cells from the bone marrow



Figure 6b: Injection of stem cells into the knee

SURGERY

The method of surgical treatment will depend on the diagnosis. Many knee soft tissue surgeries are now done via a minimally invasive approach with knee arthroscopy. Small incisions are made to insert a scope, which allows fibre optic visualisation of the knee joint projected onto a screen (see Figure 7). Knee arthroscopy allows multiple views inside the knee joint, with lesser trauma compared to open surgery. The surgeon would then perform the surgery via the portals (small skin incisions) created (see Figure 8).

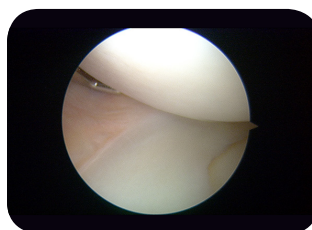


Figure 7: Arthroscopic photo of a knee joint showing the meniscus and the cartilage



Figure 8: Small skin portals for selected knee keyhole surgery

SEEKING APPROPRIATE MEDICAL OPINION

"Ouch, my knee hurts" is a complaint commonly heard in sports. It is necessary to seek appropriate medical opinion to get the best advice on how to manage a painful sporting knee. To learn more about minimally invasive knee surgeries, a sports surgeon is the specialist to speak to. The symptoms mentioned in this article are non-exhaustive and one should always seek a doctor's consult if in doubt. **PRIME**

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