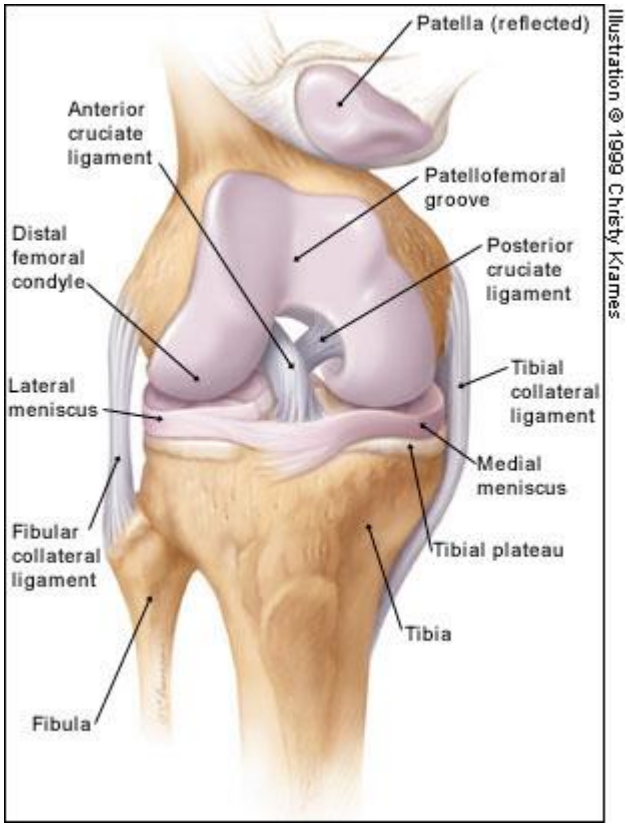
SOFT TISSUE KNEE INJURIES

Soft tissue injuries of the knee commonly occur in all sports or in any activity that requires sudden changes in activity or movement. The knee is a complex joint and any injury to one or more of the soft tissue structures will result in acute knee pain.

A knee sprain is defined as the stretching or ultimately tearing of one of more of the ligaments in the knee subsequently leading to acute knee pain and possibly joint instability. It can be graded as follows:

- **Grade 1** – stretched ligament fibres, little or no joint instability
- **Grade 2** – moderate stretching and tearing of ligament fibres, increased laxity but a definite end point
- **Grade 3** – complete tear of ligament fibres. Excessive laxity with no end point

By understanding the role of the different soft tissue structures in the knee, a greater appreciation of mechanism of injury and likely consequence of injury can be achieved.



HISTORY

The aim of the history is to elicit the exact mechanism of injury, the timing and progression of swelling, the immediate weight bearing status, location of pain and knee locking.

Mechanism of injury – identifying the direction of external stresses and position of knee will help locate potential damaged structures. ACL injury is more common in hyperextension mechanisms whilst PCL is more common on falling on a flexed knee. Any valgus or varus force on the knee can cause collateral ligament injury. A sensation of a pop or tear or something giving way is associated with either an ACL rupture or patella dislocation.

Swelling – the presence of a tense effusion (haemarthrosis) within 1-6 hours is predictive of a major cruciate ligament injury or a patella dislocation. Knee swelling developing over 6-24 hours is a feature of meniscal injuries. Whilst MCL sprains present with very little or no effusion.

Weight bearing – the inability to continue physical activity is a feature of a cruciate injury. Total inability to weight bear should raise suspicion of a possible fracture or osteochondral injury. Whilst gradual weight bearing deterioration over 24 hours is more likely due to a meniscal injury.

Knee locking – significant reduction in passive knee movement is due to loose or displaced meniscal tissue being impinged in the joint are commonly seen in meniscal injuries.

EXAMINATION

The aim of examination is to systematically examine each knee structure highlighting the location and severity of any abnormalities detected.

Inspection – inspect standing, walking and supine. Looking for any scars, mal-alignment, swelling, bruising and deformities.

Active and passive movements – assess the range of movement and presence of pain

Palpation – palpate the quadriceps, hamstring, gastrocnemius LCL and MCL. Pain from cruciate injuries are poorly localized unlike collateral ligament injuries which often can be well localized.

Patella – palpate for a patella effusion. An acute knee effusion can be caused by an ACL rupture, patella dislocation, intracondylar fracture or a meniscal injury which presents with a delayed knee effusion. Once a patella effusion is detected, a patella apprehension test should be performed to test for patella dislocation.

Cruciate ligaments – ACL – lachman's test, anterior drawer, pivot shift test, PCL - posterior drawer test

Collateral ligaments – valgus/varus stress tests

Meniscal injuries – mcmurray's test, duck walking - The patient bends down by flexing at the knees and attempts to walk forward in this position. This may cause pain in patients with meniscal pathology.

Any laxity detected in either the cruciate or collateral ligaments should be classified according to the ligament grading scale

Any bony tenderness or any high velocity mechanism of injury should raise suspicion of a fracture. Ottawa knee rules can provide guidance on the need of x-ray imaging.

Ottawa knee rules

- Age 55 years or older
- Tenderness at head of fibula
- Isolated tenderness of patella
- Inability to flex to 90°
- Inability to bear weight both immediately and in the emergency department (4 steps)

If a cruciate ligament or a grade 3 medial collateral ligament or a meniscal injury is suspected then the patient should be referred to orthopaedics for further assessment. Grade 1 and 2 MCL injuries can be treated conservatively with a good rehabilitation program under the supervision of the general practioner. However professional athletes would benefit from early physiotherapy involvement as they often require more intense rehabilitation programs. LCL injuries are uncommon however if an LCL injury is suspected it should be treated in the same method as MCL injury.

TREATMENT

Treatment is dependent upon the exact nature and severity of injury, current occupation and previous injury history. In particular a meniscal injury in an individual participating in non-twisting activities can be successfully treated conservatively. However an individual involved in twisting activities such as football may benefit from more intense rehabilatation under the supervision of a physiotherapist or even surgery.

Conservative management involves initial treatment and then rehabilitation. In the first 24-48 hours (initial treatment) the aim is to reduce swelling and further oedema by using **RICE**:

Rest reduces the risk of further haemorrhage and mechanical injury.

Ice facilitates vasoconstriction and thus helps with swelling reduction. Apply an ice pack immediately following injury for 15 minutes. Repeat this every 2 hours.

Compression reduces bleeding and therefore minimizes swelling

Elevation decreases hydrostatic pressure and thus reduces the accumulation of interstitial fluid

Rehabilitation is based around restoring range of movement, muscle strength, proprioception and returning to sport. After the initial treatment phase, gentle mobilisation should be encouraged. Analgesia may be required; NSAIDs are avoided as their efficacy in ligament sprains is unproven.

Restoration of full range of motion – Early weight bearing is encouraged as tolerated to help minimise muscle strength loss. Initially partial weight bearing may be suitable with the assistance of crutches, strapping or braces.

Muscle strength – as weight bearing improves active knee extension and flexion should be encouraged with increasing resistance as pain allows.

Proprioception – proprioception is invariable impaired after knee ligament injury. Early proprioception such as balancing on one leg progressing to functional activities whilst

balancing should be encouraged. In more severe knee injuries, further proprioception exercises may be necessary with the aid of a physiotherapist.

Functional exercises – once range of movement is pain free and patient is fully weight bearing, functional exercises such as jumping and hoping should be encouraged.

Return to sport – sporting activities can be recommenced when functional exercises can be performed pain free during and after activity.

ATRAUMATIC KNEE PAIN

Occasionally patients present with atraumatic acute knee pain and effusion with no obvious mechanism of injury. In cases like these alternate aeitlogies such as arthritis, septic arthritis, gout, pseudogaut and reactive arthritis.