I. Clinical Approach to a patient presenting with knee pain

History: Age, Gender, Physical appearance, Training status
Previous injury?
How did the symptoms occur? Let the patient demonstrate.
How does the patient perceive the symptoms regarding duration, intensity and location?

Clinical examination: (comparing injured / non injured side)
Inspection-Palpation: local signs and symptoms, effusion (intra articular disorder)
Range of Motion (ROM): active flexion-extension
Tests performed throughout ROM (provocation!)
Joint function tests:
Lachmann test (ACL)
Valgus test 0 & 15 degrees of flexion (Medial collateral ligament)
Rotation-Compression tests-(Meniscus, Cartilage)
Muscle function tests:
Hip flexion extended knee (m. rectus femoris)
Knee extension (mm. quadriceps)
Knee flexion (m. hamstrings)

Preliminary diagnosis?
Verifying investigations?
Management?

Some Differential Diagnoses and Investigations to be considered

Ligament ruptures: Clinical diagnosis-hemarthrosis-effusion-previous sprain-giving way (ACL Lachmann, PCL-posterior sagging, MCL pain + positive valgus stress in extension/in flexion combined meniscus tear?)

Anterior knee pain: Various etiological factors and diagnoses

Meniscus tears: Locking-effusion-rotation/compression test positive at any angle of knee flexion, local pain at the joint line

Osteoarthritis: Recurrent effusions, pain during squatting, resting and activity pain, morning stiffness

Osteochondritis dissecans: Adolescents, pseudolocking, pain

Management of acute ACL injuries
Patients with an acute distortion of the knee and concomitant pain and swelling should be suspected to have a severe intraarticular injury.

Patients with hemarthrosis have in up to 70% an ACL injury, which is often associated with other intraarticular injuries to meniscus and cartilage. An ACL rupture may
occur without major effusion.

Lachmann test is the most sensitive stability test for the ACL and discriminates a total rupture in 80-95%. X ray should be performed in order to rule out a fracture, in particular in growing athletes.

A patient with an acute hemarthrosis and positive Lachmann test should be referred to a specialist for diagnosis and treatment.

A number of individual factors, the most important being subjective “giving-way” episodes and inability to participate in required activities favour operative treatment.

If non-operative treatment is indicated the patient should be advised to decrease the activity level in particular including pivoting.

In growing athletes a Grade II-III tibial spine avulsion is the corresponding injury to an ACL rupture in adults. ACL mid-substance ruptures occur from 10 years of age.

Postoperative rehabilitation should be based on early mobilisation including early full weight bearing and training throughout full ROM.

A stable reconstruction decrease the risk of a secondary meniscus injury. A combination of ACL + meniscus injury requiring partial meniscectomy increase the risk of osteoarthritis.

The relationship between ACL insufficiency and development of future osteoarthritis is not known.

**Management regarding Meniscus/Cartilage injuries**

Patients with symptoms of an intraarticular injury should be treated by an orthopaedic surgeon. A meniscus injury should be treated from symptoms and functional consequences for the patient. The clinical picture may vary significantly due to the varying pathoanatomy of the injury.

Osteoarthritis is a disorder affecting all tissues in and around the joint. The cartilage injury is thus only one manifestation and not correlated to the degree of symptoms.

**Management regarding anterior knee pain**

Anterior knee pain is a diffuse entity including a number of possible pathoanatomic features. Activity related pain from running, squatting, stair climbing on long time sitting (movie sign) are typical.

The preliminary “diagnosis” should be anterior knee pain.

Empirically most patients can be helped by non-operative management including various physiotherapy modalities such as taping, quadriceps training and adjustments in training.

**II. Clinical Approach to a patient presenting with ankle pain**

**History:** Age, Gender, Physical appearance, Training status

Previous injury?
How did the symptoms occur? Let the patient demonstrate.
How does the patient perceive the symptoms regarding duration, intensity and location?

**Clinical examination:** (comparing injured / non injured side)
- Inspection-Palpation: local signs and symptoms
- **Range of Motion:** active flexion-extension-eversion-inversion
  - Tests performed throughout ROM (provocation!)
- **Joint stability tests:**
  - Anterior drawer sign (FTA ligament)
  - Talar tilt test (FC vs Deltoid ligament)
  - Syndesmosis ligament provocation

**Muscle function tests:**
- Plantar flexion extended knee (mm. gastrocnemii)
- Plantar flexion semiflexed knee (m. soleus+deep plantar flexors)
- Dorsiflexion (m. tibialis anterior, toe extensors)
- Eversion-inversion (m. peroneii, m. tibialis anterior)

**Some Differential Diagnosis and Investigations to be considered**
- **Fractures**: significant trauma-radiographic examination
- **Stress fractures**: gradual onset of pain during activity
- **Intraarticular lesions**: sprain-persistent pain-swelling-locking
- **Ligament ruptures**: previous sprain-giving way-clinical diagnosis
- **Achilles tendon rupture**: sudden pain during activity-clinical diagnosis- muscle dysfunction-Thomson's test positive
- **Tendon dislocation/rupture**
- **Nerve entrapments**
- **Excessive soleus muscle**
- **Os trigonum**: dancers
- **Achilles paratendonitis or tendinosis**

**Management of Ankle Sprains**
Acute ankle sprains should primarily be handled in the sports field by trained athletes, physiotherapists and doctors
In a severe sprain with concomitant bleeding the lateral ligaments are almost always ruptured in total. Deltoid ligament ruptures are uncommon and often associated with syndesmosis ruptures!
The most important acute treatment is a thoroughly adapted maximal pressure bandage to stop the bleeding. After 30 minutes it may be changed to a looser fitted compression bandage. An active mobilization including immediate full weight bearing is recommended as a routine in combination with a few weeks of coordinative training. Crutches and immobilisation should be avoided.
A majority (80-90%) of the ligament ruptures heal without sequeale. In the
remaining 10-20% recurrent instability and/or pain may occur.

Patients with symptom giving instability are recommended 10-12 weeks training regime under physiotherapists guidance. If this regime is not sufficient the patient should be referred to a sports orthopaedic doctor for decision on operative treatment. Arthroscopy is useful for diagnostic and therapeutic purpose in patients with recurrent instability and/or pain.

III. Clinical Approach to a patient with shoulder instability or pain

History: Age, Gender, Physical appearance, Training status
  Previous injury?
  How did the symptoms occur? Let the patient demonstrate.
  How does the patient perceive the symptoms regarding duration, intensity and location?

Clinical examination: (comparing injured / non injured side)
  Inspection-Palpation: local signs and symptoms, muscle atrophy
  Range of Motion: active flexion-extension-abduction
                  neutral/inward/outward)-outward rotation (neutral/90 degrees of abduction)-inward rotation Tests performed throughout ROM (provocation!)
  Joint tests: apprehension test, sulcus sign, impingement tests, cross body test, Jobes test, general laxity tests
  Muscle function provocation tests: extension, flexion, abduction, outward-inward rotation. Test also pectoralis & latissimus function

A thorough examination of the neck and upper back should always be conducted to rule our referred pain disorders!

Some Differential Diagnoses and Investigations to be considered

Anterior shoulder dislocation & instability-fall on outward rotated arm, significant trauma the first dislocation, pain, instability- positive apprehension test-positive relocation test

Multi directional instability-positive general laxity tests, recurrent subluxations, no trauma

Posterior dislocation & instability-fall on outstretched arm-epilepsy-alcoholics

Impingement disorders-pain on over head activities (younger-instability, older rotator cuff disorders)-positive impingement test

Rotator cuff tear-positive provocation test, weakness

AC joint disorders-local pain, positive cross body test

Nerve entrapment-posterolateral pain, pathologic EMG

Referred pain from neck or upper back-positive neck or springing tests

Thoraco scapular instability or muscular dysfunction-positive provocation test
Management of Anterior Dislocation & Instability

The diagnosis of multi directional instability require a positive sulcus sign and the patient should not have a Bankart or Hill Sachs lesion.

In younger patients redislocation is the most common complication to an anterior dislocation. In elderly patients decreased RoM and related pain are more common.

A Bankart lesion is present in up to 80% of the patients with anterior dislocation.

MRI is not generally indicated after an anterior dislocation

Immobilisation after an anterior dislocation does not decrease the recurrence rate and should therefore be avoided. Prior to return to sports the patient should have restored muscle function and have a negative apprehension test.

The Bankart procedure is the standard procedure resulting in 90% excellent/good result. The purpose of the operation is to restore function, not to decrease the future risk of osteoarthritis.

Primary impingement (structural) should be differentiated from secondary impingement due to instability.

Multidirectional instability should always primarily be treated by non-operative modalities including physiotherapy.

A rotator cuff rupture does not necessarily end the athlete’s career. Most patients suffer from partial ruptures and can be treated by arthroscopic decompression or a rotator cuff repair. A total rupture occur mainly in older patients and is due to a degenerative disorder of the rotator cuff tissues.