



Pain is not always a bleed?

Recognising other causes of pain across the lifespan

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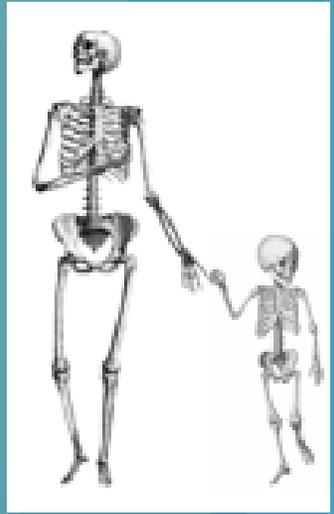
Abi Polus

Senior Clinical Physiotherapist

The Alfred

Children and Adolescents Are Not Mini Adults!

- ▶ Many injuries that occur are due to physiological differences in the growing skeleton.
 - ▶ Growth Plates
 - ▶ Responsible for longitudinal bone growth
 - ▶ Injuries can produce growth disturbance at the associated growth plate resulting in deformity
 - ▶ Prior to skeletal maturity – physis 2-5x weaker than surrounding fibrous tissue – children often have fractures & avulsions rather than ligament & tendon injuries.
 - ▶ The same mechanism of injury may result in a different pathological condition in children from adults.



X Ray Comparison in Children & Adults

Normal X-ray appearance of joints



Child's knee

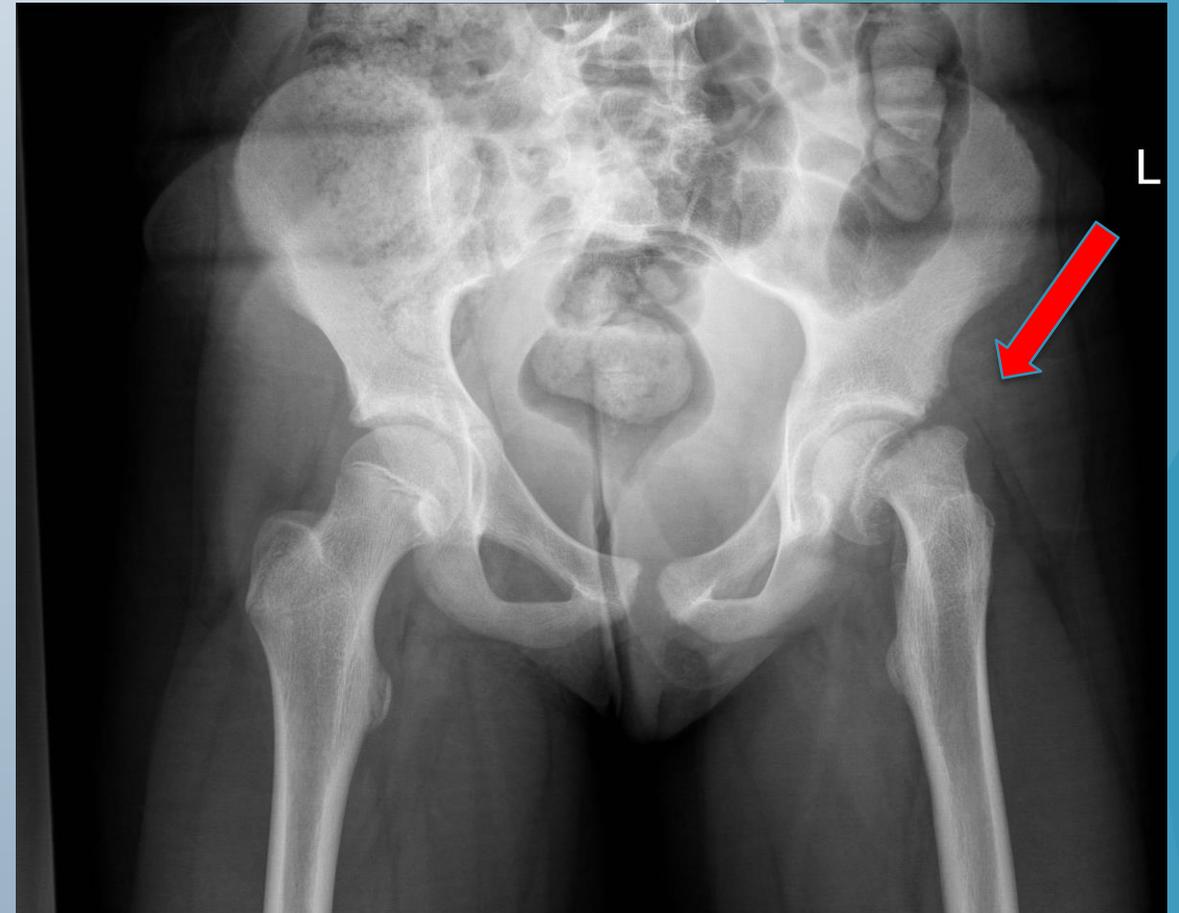


Adult knee



Slipped Upper Femoral Epiphysis (SUFE)

- ▶ Age – usually between 9 and 15 with a peak approx 12-13yrs
- ▶ Historically seen in overweight boys.
- ▶ Most commonly gradual onset but may occur suddenly and 7% bilateral presentation
- ▶ Clinical Presentation
 - ▶ Antalgic Gait
 - ▶ Vague pain in groin, thigh or knee (acute pain in sudden presentations eg post fall)
 - ▶ On examination – shortened, externally rotated limb
 - ▶ Obligatory external rotation with passive hip flexion



Slipped Upper Femoral Epiphysis (SUFE)

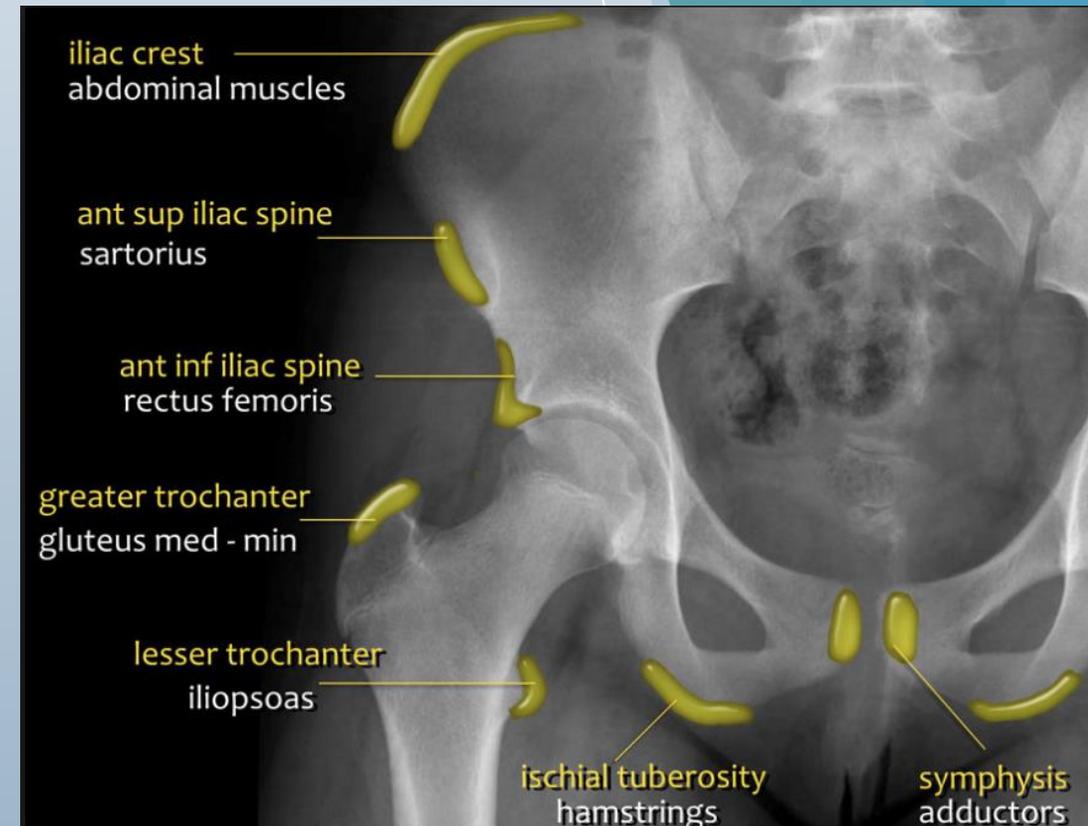
- ▶ Imaging
 - ▶ Plain X Ray
- ▶ Management
 - ▶ Immediate referral to Orthopaedics for surgical pinning.
 - ▶ Prophylactic pinning of non affected side controversial
- ▶ Complications
 - ▶ Compromise of vascular supply to femoral head leading to avascular necrosis and early osteoarthritis
 - ▶ Chondrolysis – often due to pin penetration. Incidence decreasing with improved surgical techniques
 - ▶ Femero-acetabular impingement due to deformity of femoral neck.



Avulsion Fractures of the Pelvis

▶ Aetiology

- ▶ Can occur at any point where a muscle attaches to bone as the cartilaginous secondary centre of ossification is weaker than the tendon.
- ▶ More common in boys
- ▶ Mean age approx 14.5yrs
- ▶ Common sites
 - ▶ Ischial Tuberosity - Hamstrings
 - ▶ AIIS - Rectus Femoris
 - ▶ ASIS – Sartorius
- ▶ Clinical Presentation
 - ▶ Similar to an acute muscle tear (Grade 2-3)
 - ▶ Acute pain, swelling, muscle weakness, inability to weight bear. Often describe a 'popping' sensation with the onset of discomfort.



Avulsion Fractures of The Pelvis (Cont)

- ▶ Imaging
 - ▶ Fracture confirmed on plain X Ray
- ▶ Management
 - ▶ Similar to Grade 3 Muscle Tear – reduction of pain / swelling
 - ▶ Avoid early range of motion / stretching as this may result in further displacement of fragment leading to non-union
 - ▶ Orthopaedic review – occasional role for ORIF of avulsed fragment
 - ▶ Graduated muscle strengthening / restoration of full ROM
- ▶ Complications
 - ▶ Non-union, pain, nerve irritation, muscle weakness , heterotopic ossification resulting in impingements, reduction in athletic performance.



Traction Apophysitis

- ▶ Occurs as the musculoskeletal unit (muscle/tendon) is relatively stronger than the open apophysis
- ▶ Often relating to repetitive microtrauma / sudden changes in load Despite initial thoughts and the name ‘itis’ meaning inflammation, MRI confirms that the condition is primarily non-inflammatory.
 - ▶ Most Common
 - ▶ Knee – Osgood Schlatters (Tibial Tubercle) / Sinding-Larsen Johansson (Inferior Pole of Patella)
 - ▶ Ankle – Severs (Calcaneal Attachment of Achilles)
 - ▶ Can occur at any tendon attachment to apophysis – proximal hamstring, rectus femoris, rectus abdominus

Calcaneal Apophysitis (Sever's ~~Disease~~)

- ▶ Aetiology
 - ▶ Repeated traction of the achilles tendon at the calcaneus.
 - ▶ Occurs in boys between ages of 8 and 12.
 - ▶ Clinical Presentation
 - ▶ Pain onset usually insidious
 - ▶ Localised tenderness over achilles attachment
 - ▶ Occasional swelling
 - ▶ Pain worse with activity and eases with rest
 - ▶ Can be unilateral or bilateral
 - ▶ Often occurs with commencement of new activities / increases activity



Calcaneal Apophysitis (~~Sever's Disease~~)

- ▶ Imaging
 - ▶ Nil required – clinical diagnosis
- ▶ Management
 - ▶ Load Modification
 - ▶ Biomechanical and muscle balance correction
 - ▶ ?Offloading techniques – footwear modification, taping, orthotics, heel raises
 - ▶ Symptomatic Relief - Ice
 - ▶ Outcome
 - ▶ Self Limiting – pain and functional limitation can however last for long periods
 - ▶ Complete recovery is expected with bony maturation.



Osgood Schlatter's

▶ Aetiology

- ▶ Repeated traction of the quadriceps muscle attachment into the tibial tubercle. Similar presentation at inferior pole of patella – Sinding- Larsen-Johansson
- ▶ Symptoms correlate with adolescent growth spurt. Occurs in boys between ages of 12-15 and girls 8-13 years.
- ▶ Risk factors: High body weight (not BMI), Tight quadriceps and a quadriceps / hamstring strength imbalance
- ▶ Clinical Presentation
 - ▶ Pain onset usually insidious but can be triggered by a direct blow or fall onto the knee
 - ▶ Localised tenderness over tibial tubercle
 - ▶ Occasional swelling
 - ▶ Pain worse with activity and eases with rest
 - ▶ A secondary ossicle develops – occasional role for surgical removal.

De Lucena 2011; Nakase 2015



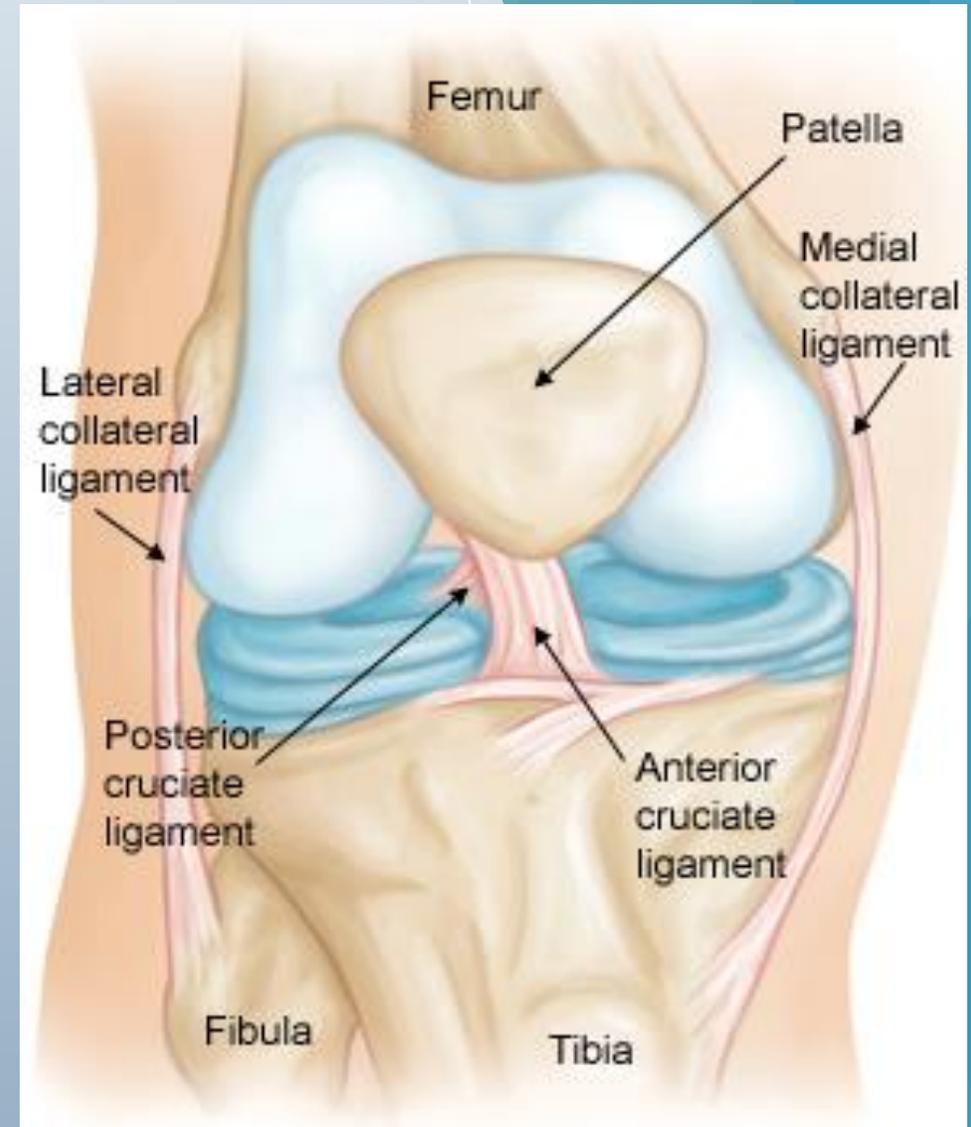
Osgood Schlatters

- ▶ Imaging
 - ▶ Nil required – clinical diagnosis
- ▶ Management
 - ▶ Load Modification
 - ▶ Biomechanical and muscle balance correction
 - ▶ ?Offloading techniques – footwear modification, taping, orthotics, bracing
- ▶ Outcome
 - ▶ Self Limiting – pain and functional limitation can however last for periods of 2 years
 - ▶ Complete recovery is expected with bony maturation. Occasional ongoing pain with kneeling activities due to increased prominence of tibial tubercle.



Anterior Cruciate Ligament Injury

- ▶ The number of reported ACL injuries in skeletally immature athletes is increasing.
 - ▶ Higher participation levels
 - ▶ Greater awareness
 - ▶ Improved imaging techniques
- ▶ Mechanism of Injury – usually non contact – pivoting on a slightly flexed knee or hyperextension
- ▶ Examination
 - ▶ Patient History – often describes an audible ‘pop’ and usually unable to Return To Play
 - ▶ Rapid swelling,
 - ▶ Ligamentous tests – Lachman’s / Pivot Shift
 - ▶ Chronic ACL insufficiency – functional instability with change of direction



ACL Injury (Cont)

▶ Imaging

- ▶ X Rays to exclude tibial eminence fracture (avulsion of attachment) – much more common in younger age groups.
- ▶ MRI – mid substance tears

▶ Management

- ▶ Tibial Eminence Fractures – Plaster immobilisation in knee extension or ORIF
- ▶ Open growth plates – Trial of conservative rehab

▶ Complications

- ▶ Post traumatic arthropathy – multifactorial
 - ▶ Poor prognosis – increasing age, meniscal injury and lack of full knee extension at discharge post operatively
- ▶ Growth plate arrest



The 11+

PART 1 - RUNNING EXERCISES - 8 MINUTES

- 1 RUNNING STRAIGHT AHEAD
- 2 RUNNING UP HILL
- 3 RUNNING DOWN HILL
- 4 RUNNING CIRCULAR PARTNER
- 5 RUNNING SHOULDER CONTACT
- 6 RUNNING QUICK FORWARDS & BACKWARDS

PART 2 - STRENGTH - PLYOMETRICS - BALANCE - 10 MINUTES

- 7 THE BENCH STRAITS
- 8 THE BENCH SIDEWAYS LEGS
- 9 THE BENCH ONE LEG LEFT ARM HOLD
- 10 SIDEWAYS BENCH STAIRS
- 11 SIDEWAYS BENCH MAKE A LOWER HIP
- 12 SIDEWAYS BENCH TEST YOUR KNEES
- 13 HAMSTRINGS BRIDGE
- 14 HAMSTRINGS INTERMEDIATE
- 15 HAMSTRINGS ADVANCED
- 16 SINGLE LEG STANCE HOLD THE BALL
- 17 SINGLE LEG STANCE SHOOTING BALL WITH PARTNER
- 18 SINGLE LEG STANCE TEST YOUR KNEES
- 19 SQUATS WITH THE BARD
- 20 SQUATS WALKING LUNGES
- 21 SQUATS
- 22 SQUATS
- 23 LUNGES METRAL JUMPS
- 24 LUNGES METRAL JUMPS
- 25 SQUATS

PART 3 - RUNNING EXERCISES - 2 MINUTES

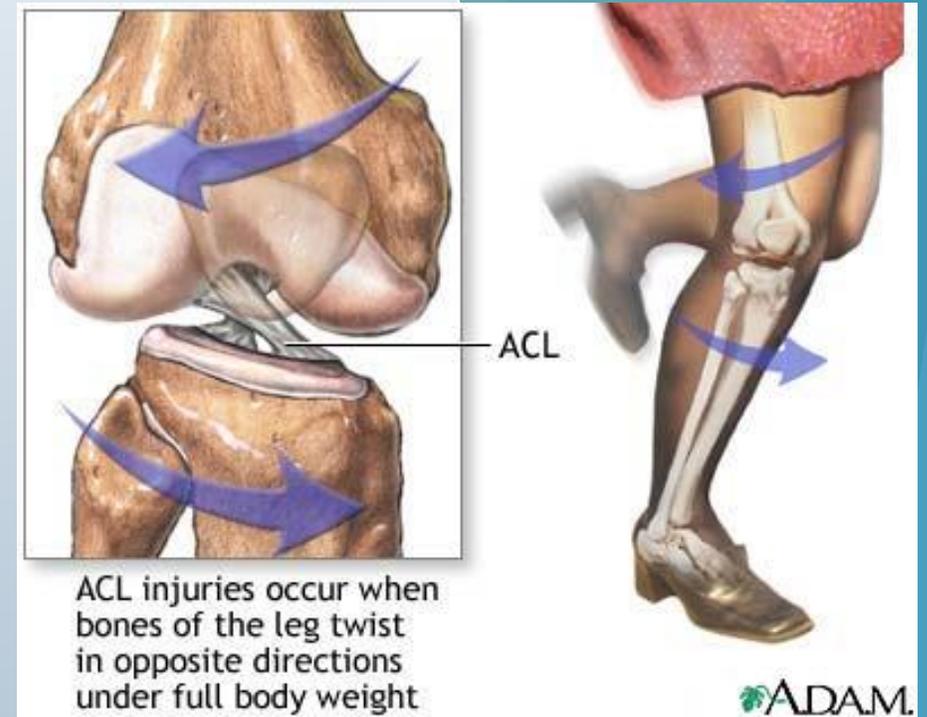
- 26 RUNNING ACROSS THE RICH
- 27 RUNNING
- 28 RUNNING PLANT & CUT

KNEE POSITION CORRECT vs KNEE POSITION INCORRECT

FAIR PLAY FOOTBALL

ACL in Adults

- ▶ More commonly seen in adults
- ▶ Usually associated with sports trauma
 - ▶ Mechanism of injury / history >> very important
- ▶ Often associated with a bleed into the knee (haemarthrosis)
 - >> even in people **WITHOUT** bleeding disorders
- >>Difficult to assess clinically after ~1hour
- >>IMAGING if history indicates possibility
- ▶ 80% ACL tears have associated bone bruising
 - ▶ Implications for bleeding and osteoarthritis



Normal Effects of Ageing on the Musculoskeletal System

From about age 30

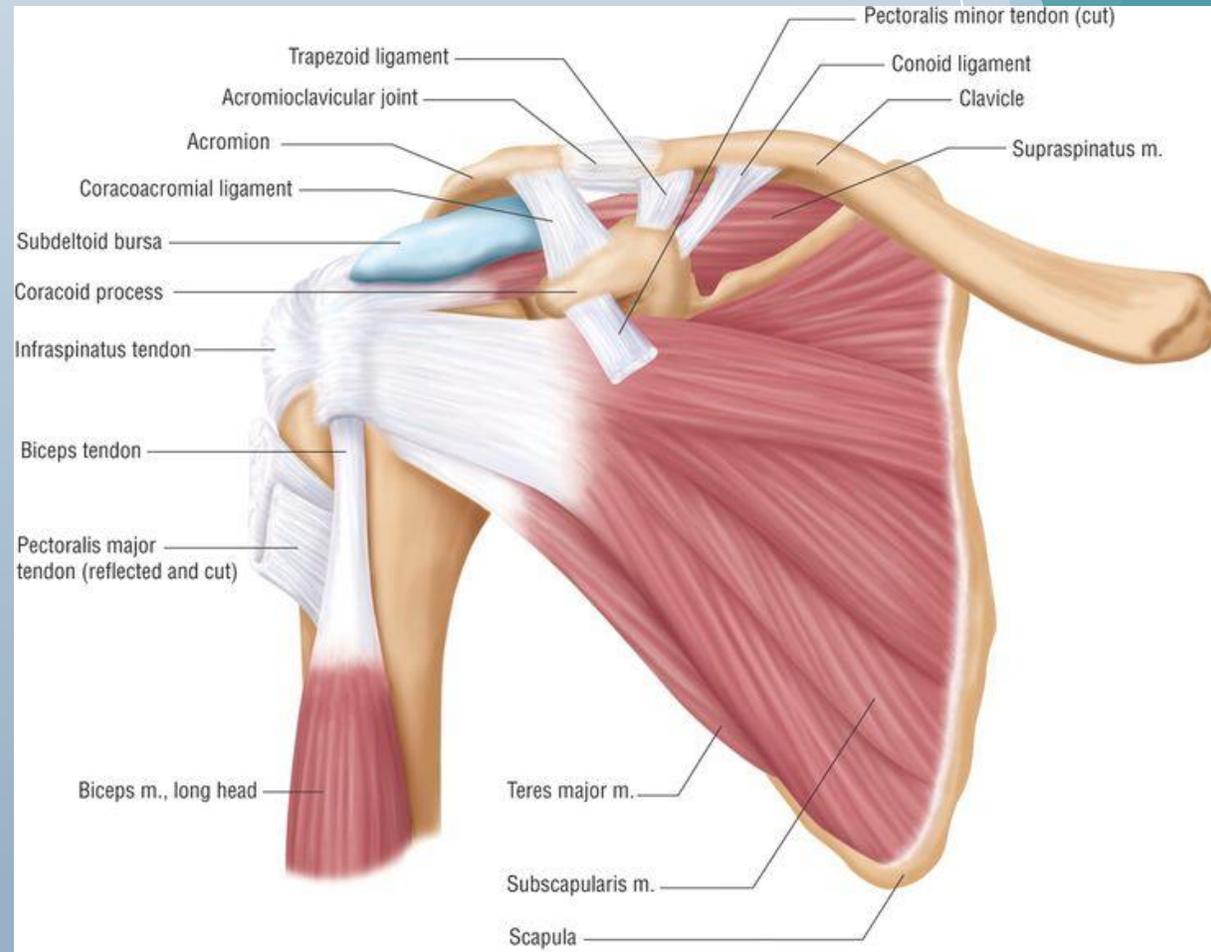
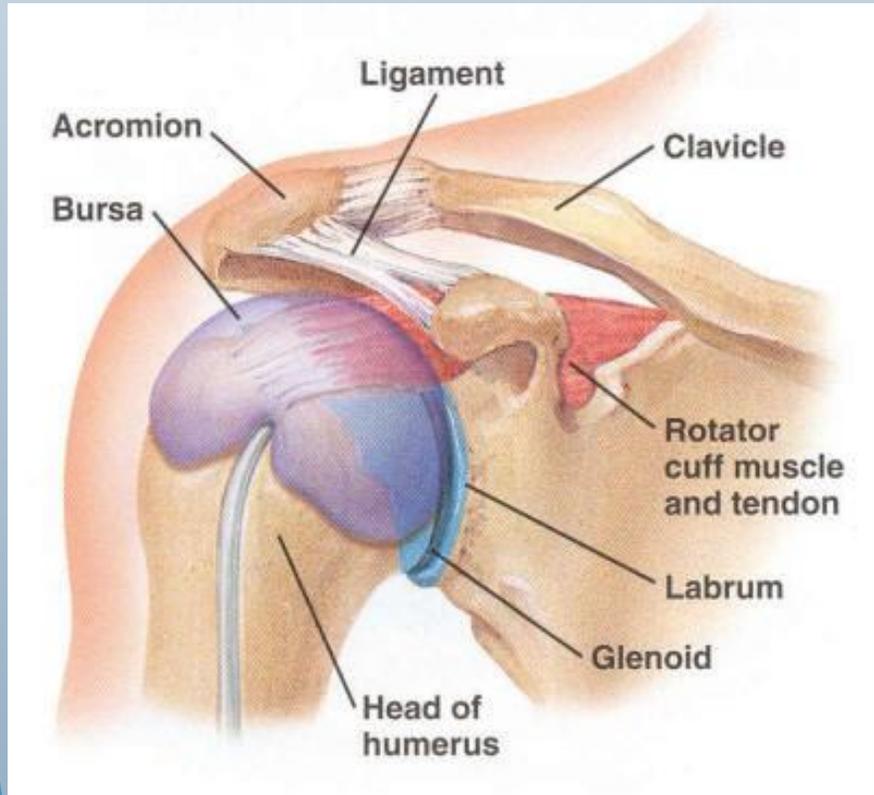


yes, 30!!

- ▶ The **density of bones** begins to diminish in men and women.
- ▶ The **cartilage** inside a joint becomes thinner, as components of the cartilage decrease.
- ▶ **Connective tissue** within ligaments and tendons becomes more rigid and brittle.
- ▶ **Loss of muscle** (sarcopenia) the amount of muscle tissue and the number and size of muscle fibres gradually decrease, and the fibre types change, resulting in gradual loss of muscle mass and muscle strength.

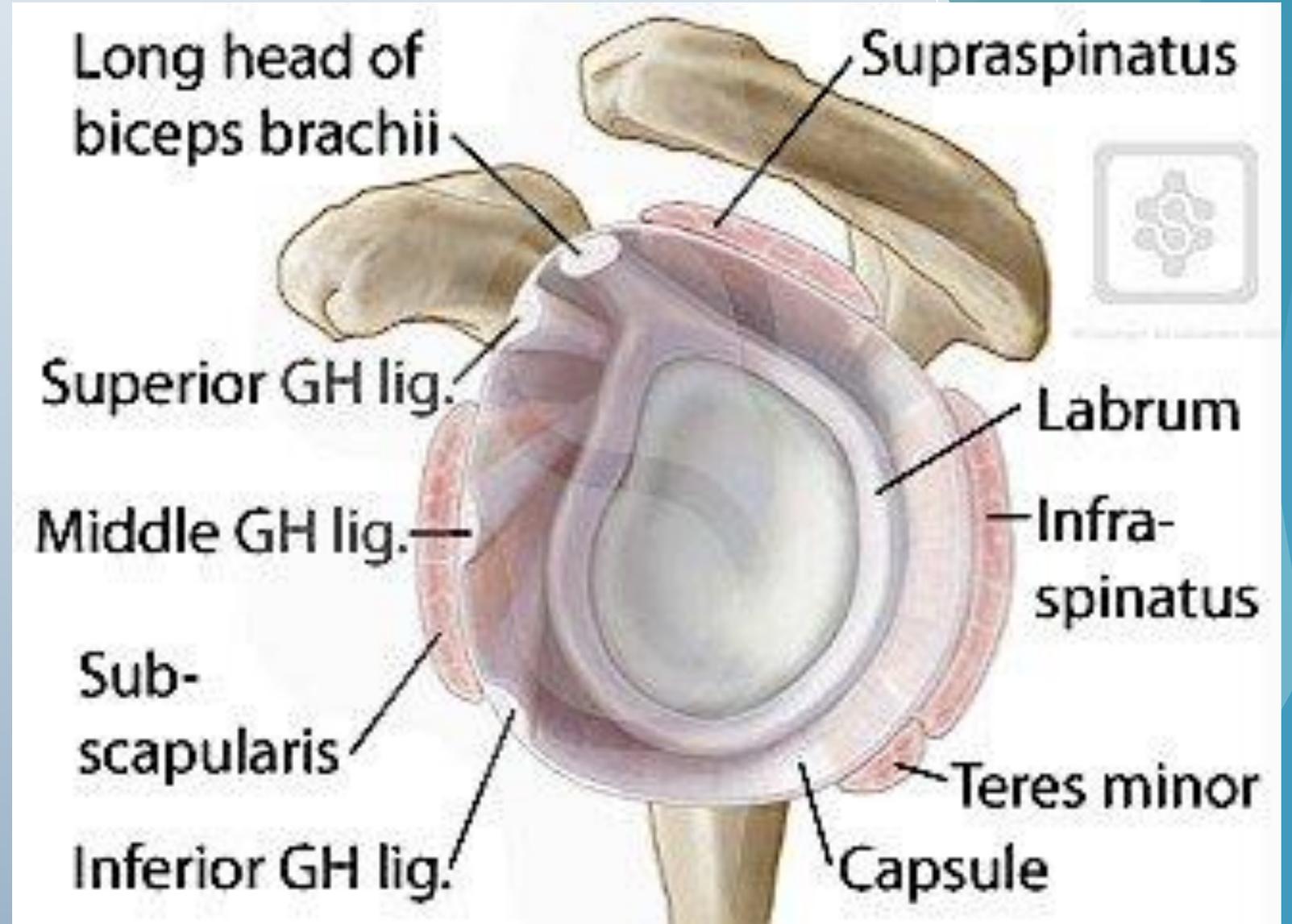
Shoulder pain

Shoulder impingements, Rotator cuff muscle pathology, Tendinopathy



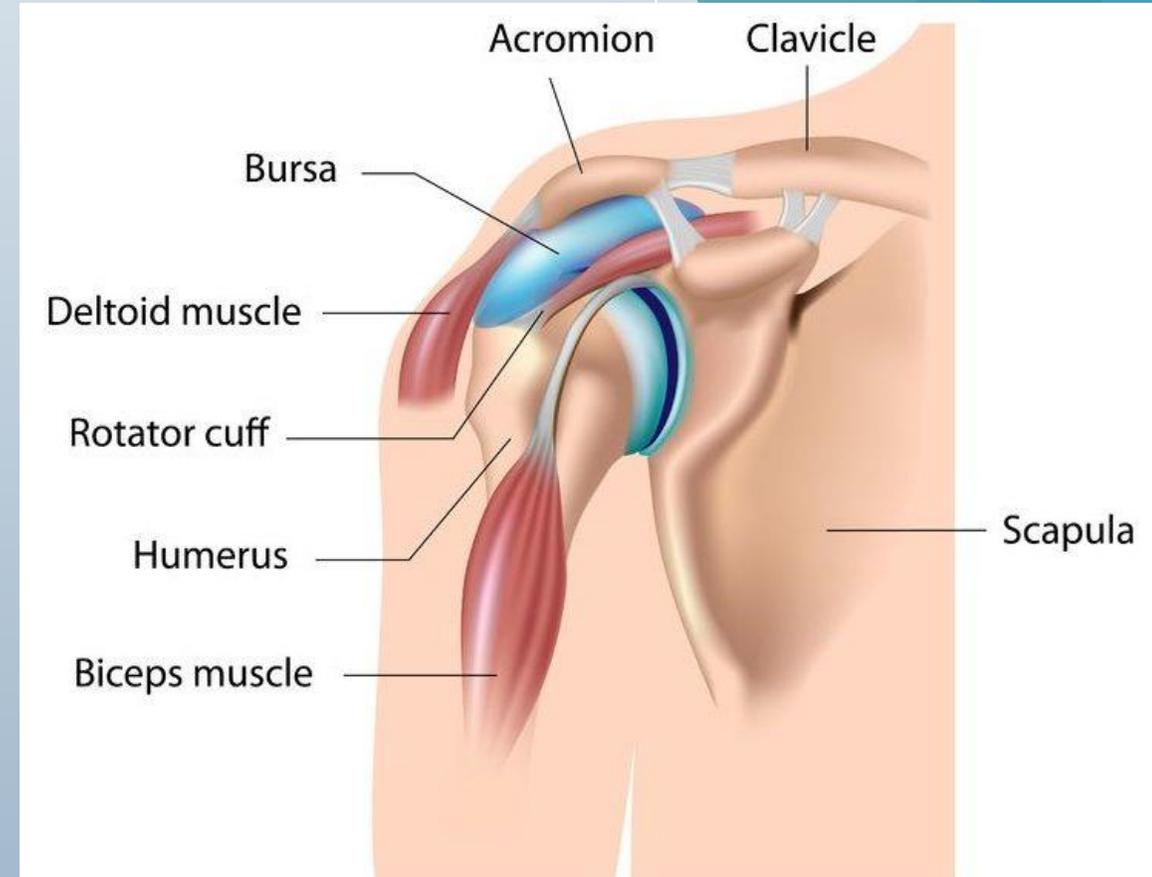


www.animalclipart.net



Shoulder 'Impingement'

- ▶ Shoulder impingements is a clinical sign, not a diagnosis.
- ▶ Rotator cuff tendons are 'pinched' or 'squeezed' as they go through the subacromial space



Rotator cuff muscle pathology

- ▶ Can be weakness
- ▶ Can be a rotator cuff tear (traumatic vs degenerative)
 - ▶ The prevalence of rotator cuff tear increases with the age and the tear should be considered as a physiological condition related to the progressive degeneration of tissues.
 - ▶ Pain and/or functional limitation are not constant in cuff tear
 - ▶ >> So beware imaging

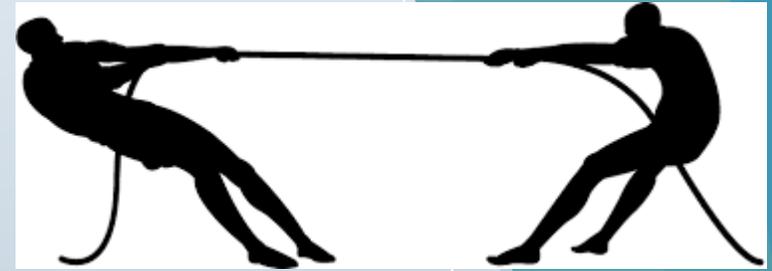
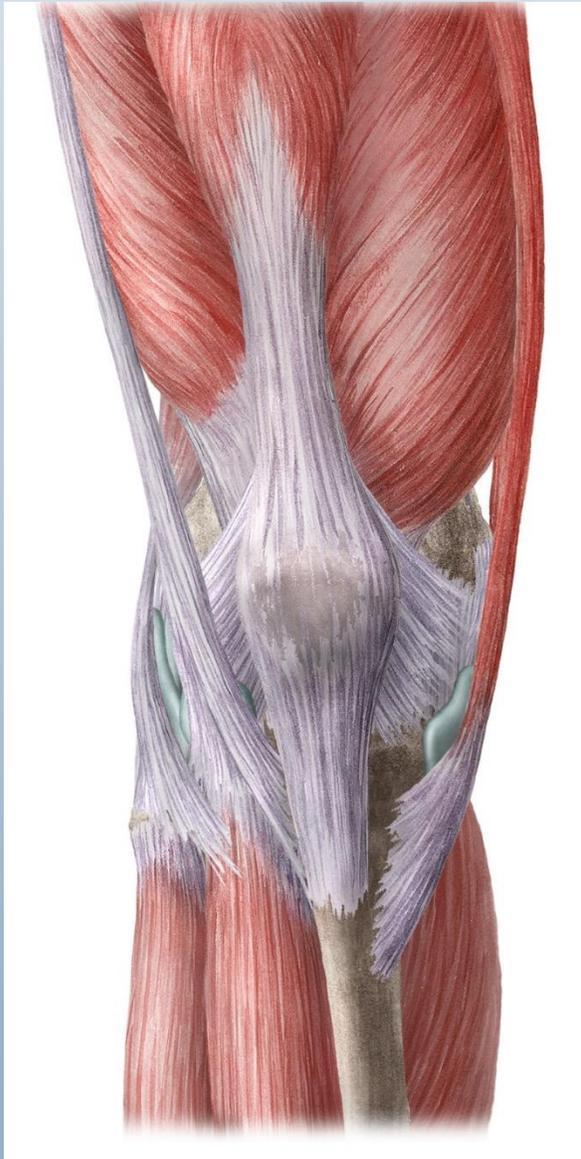
Gumina et al, 2017

Tendinopathy

- ▶ From age 30 tendinopathy is more common
- ▶ Tendinopathy arises due to two main issues
 1. Overload
 2. Overuse

Bursa

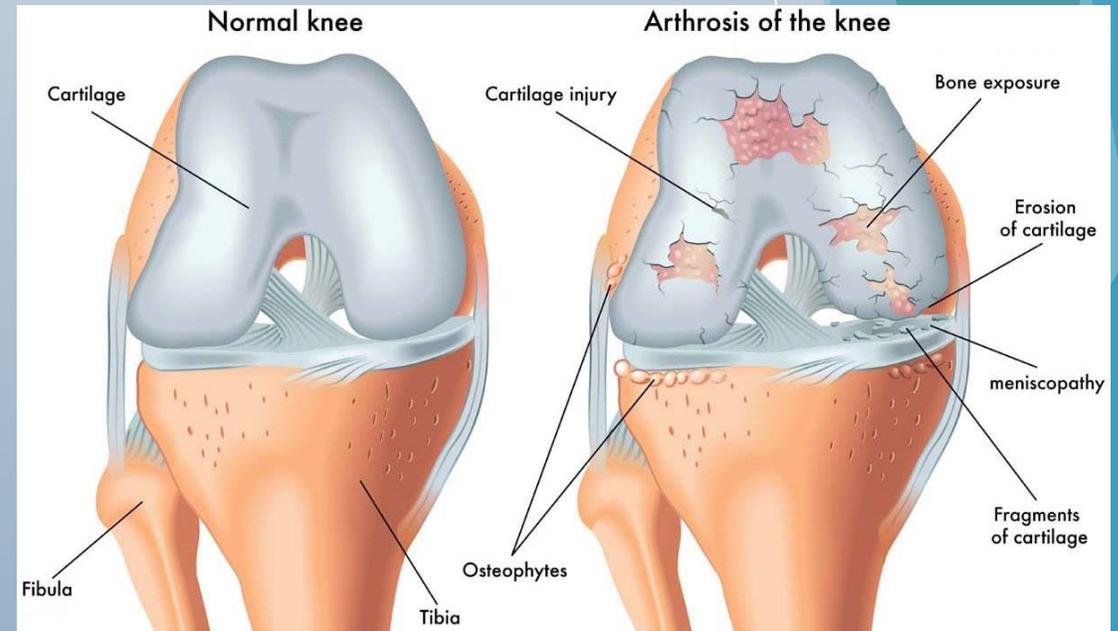
Anterior Knee Pain



- ▶ Muscle Balance
- ▶ Patella Tendinopathy

Osteoarthritis

- ▶ Arthritis may be as a result of bleeding in a joint
- ▶ Or may be due to genetics/age/weight/adverse dynamics through the chain
- ▶ Best management of Osteoarthritis
 - ▶ Exercise / Physiotherapy
 - ▶ Weight management
 - ▶ Medication and injection management
 - ▶ Operative



Case Study

- ▶ 39 yo Male, Haem A severe - Treating 1500 units x3/week prophylaxis and on top 1-2/12 for knee bleeds.
- ▶ He identified mm feels weak but not doing exs given prev.
- ▶ Description appears not consistent with bleeds>> DW team >> no inhibitor, imaging?

- ▶ Pt presented with c/o recurrent bleeds in R knee, ongoing for about 2 years.
- ▶ Yttrium in Early 2011>>no bleeds or pain until x2 in Dec 2011, steroid injection '04 Jan 2012. Pt reports does not appear to have made a change as pt reports now bleeds about fortnightly.
- ▶ (MRI prior to the yttrium shows features of significant internal derangement with osteoarthritis and some **mild secondary synovitis**).
- ▶ **Pt is on prophylaxis**
- ▶ Description of when gets a bleed:
 - ▶ -swells small amount
 - ▶ -Pain on WB on med side, no P if not WB
 - ▶ -No loss of ROM
 - ▶ -Has episodes about fortnightly on prophylaxis
 - ▶ -occasionally incidences prior but not always able to identify a cause

- ▶ O/E knee R:
- ▶ AROM 0-130 deg, PROM 0-130deg
- ▶ Power: knee E G5, F G5
- ▶ Lig tests: ACL appears intact/PCL appears intact/MCL appears intact/LCL appears intact
- ▶ Meniscal testing: Appleys and McMurrays both -ve for med and lat stressing
- ▶ Squat: able 1/2 ltd by stiff r ankle not knee
- ▶ Squat with bounce; able, no pain
- ▶ Lunge; able, no pain
- ▶ SLS: L 20 sec eo, ec; R eo 15 sec, ec difficult
- ▶ On palp: no pain elicited over lat jt line, med jt line, tendon insertions, distal pole
- ▶ VMO active and timely
- ▶ *Crepitus with F and E*
- ▶ P/ to attend HTC when have next bleed, pt agreed to this; if pain+++ or unable to manage to treat - but to call HTC first.

Rx DW pt that description is consistent with OA type flare ups rather than bleeds.

Advised not to treat next bleed but to come to HTC.

DW pt pathology of haemophilic arthritis.

DW pt that can get pain and swelling with OA type symptoms.

HEP: Additionally given SLS exc x2/day to improve proprioception on R

Provided with x2 pcs size F tubigrip with advice

- ▶ Pt telephoned dept to report that he had swelling in the R knee and ? if bleed. Advised to attend dept, which pt did.
- ▶ **o/e: Knee R has lat and central pocket of swelling.**
- ▶ **No redness**
- ▶ **No heat**
- ▶ **No reduction of range of motion (FROM 0-130 deg, crepitus at PF jt as is usual for pt)**
- ▶ **No pain**

- ▶ Clinical diagnosis: **Not indicative of a bleed, likely swelling secondary to known degeneration in knee joint.**
- ▶ DW with pt at length. DW pt differences between presentation of a bleed and symptomatic swelling due to degenerative changes.
- ▶ Medical and Nursing staff observed and agreed.

Rx/ Plan of what to do if this type of swelling occurs:

- Do NOT treat with factor replacement unless you have concerns that it is a bleed or swelling WITH pain, reduction in ROM, heat.

Can contact dept HTC if unsure.

- Tubigrip

- Ice

- elevation

- General rest 24-48hrs; can mobilise if want and no pain

- Can use crutches for peace of mind 24-48 hours but not a necessity

- Avoid repetitive use of knee during this time and also squatting or twisting (during swelling flare up).

- Avoid heavy lifting or mobilising very long distances (during swelling flare up).

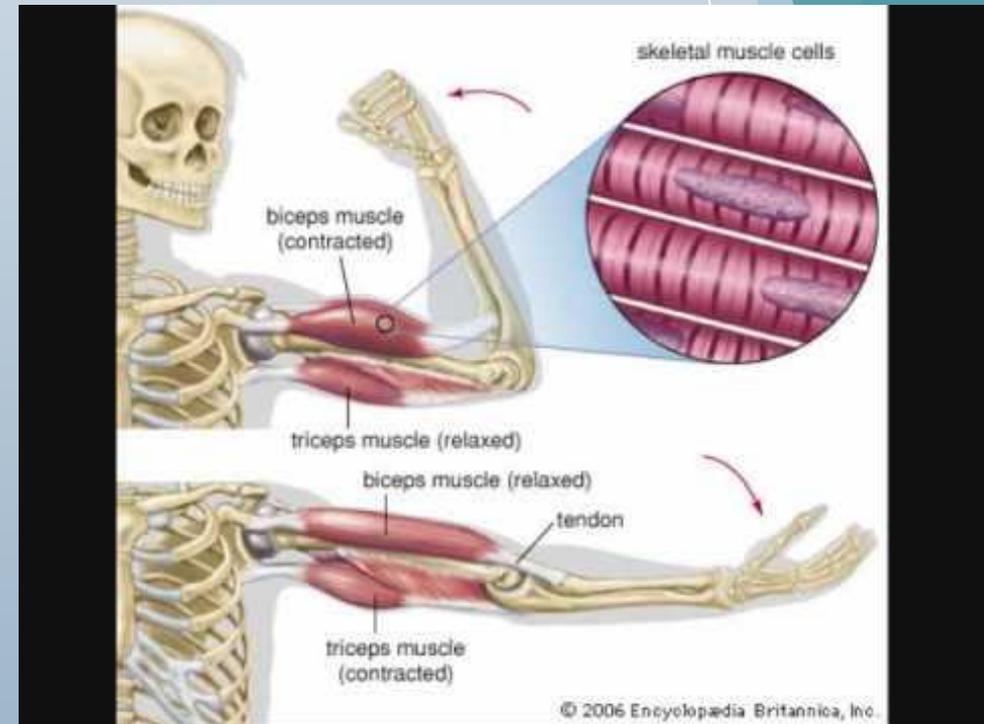
To call dept if concerned.

- ▶ Outcome: Pt has had no further reported knee bleeds
- ▶ Reports knee feels stronger and he has less symptoms and flare ups.
- ▶ On occasion does have a flare up feels confident in how to manage them.

It's a System



"What was initially thought to be a simple process is in fact an incredibly complicated, intricate, and complex system that I've codified and organized into a few easy-to-follow rules that are more difficult to implement than you'd think."



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ACL Injury Prevention

- ▶ Neuromuscular training appears to reduce the risk of injury – incorporates plyometrics, strengthening combined with feedback on proper technique
- ▶ FIFA 11 program
- ▶ PEP (Prevent Injury and Enhancement Program)

