

KNEE INJURY PREVENTION WORKSHOP

Presented by

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This is a joint project by Cycling WA & the Perth Integrated Health Clinic for the WA cycling community.

The effect of cycling on knees-simple facts.....

- Most people seem to think cycling is hard on knees – they are wrong!
- Statistics – average cadence (revolutions) of 90 rpm – the cyclist churns out 5400 pedal revolutions per hour!
- Yet cycling is relatively benign on this complex joint because there is no heel strike thus not high impact as well as not full weight bearing
- In fact cycling is used by many clinicians such as our clinic for rehabilitation of most knee injuries

ANATOMY OF THE KNEE

● Bones

○ Femur

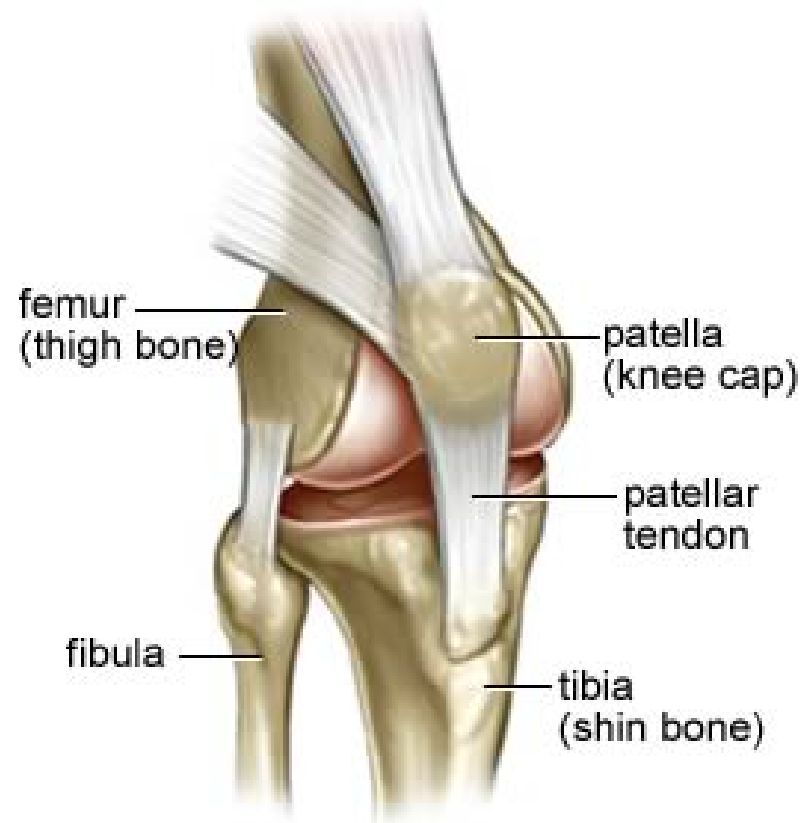
○ Tibia

○ Fibula

○ Patella

○ Cartilage

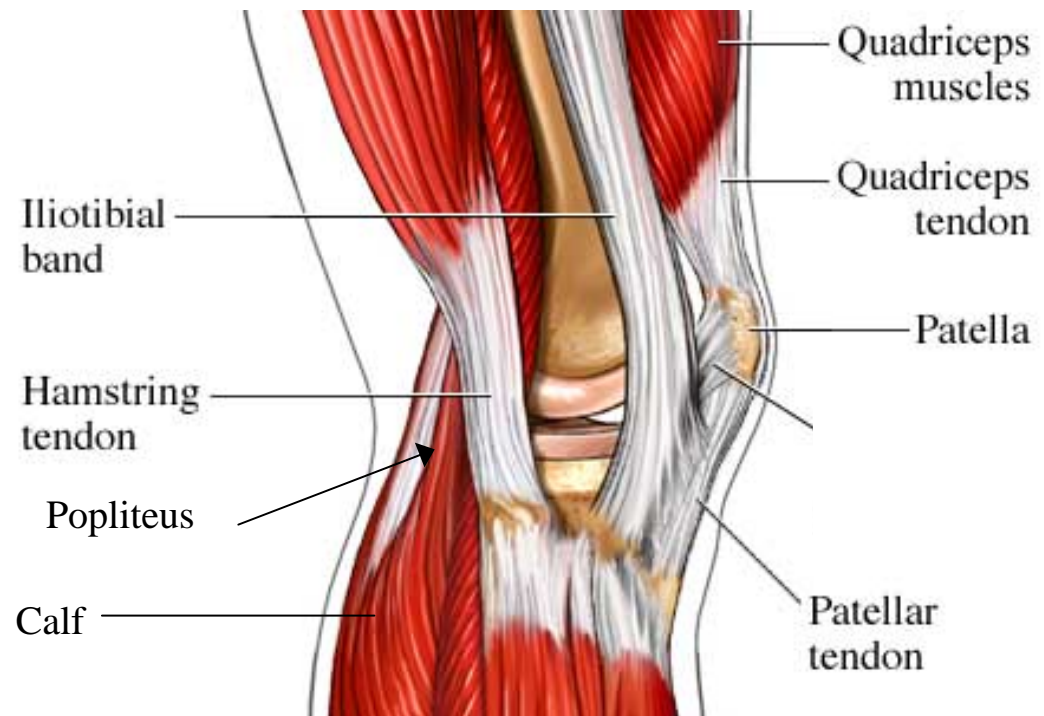
○ Hinge joint



ANATOMY

● Muscles

- Quadriceps
- Hamstrings
- Adductors
- Sartorius
- ITB
- Calves
- Popliteus

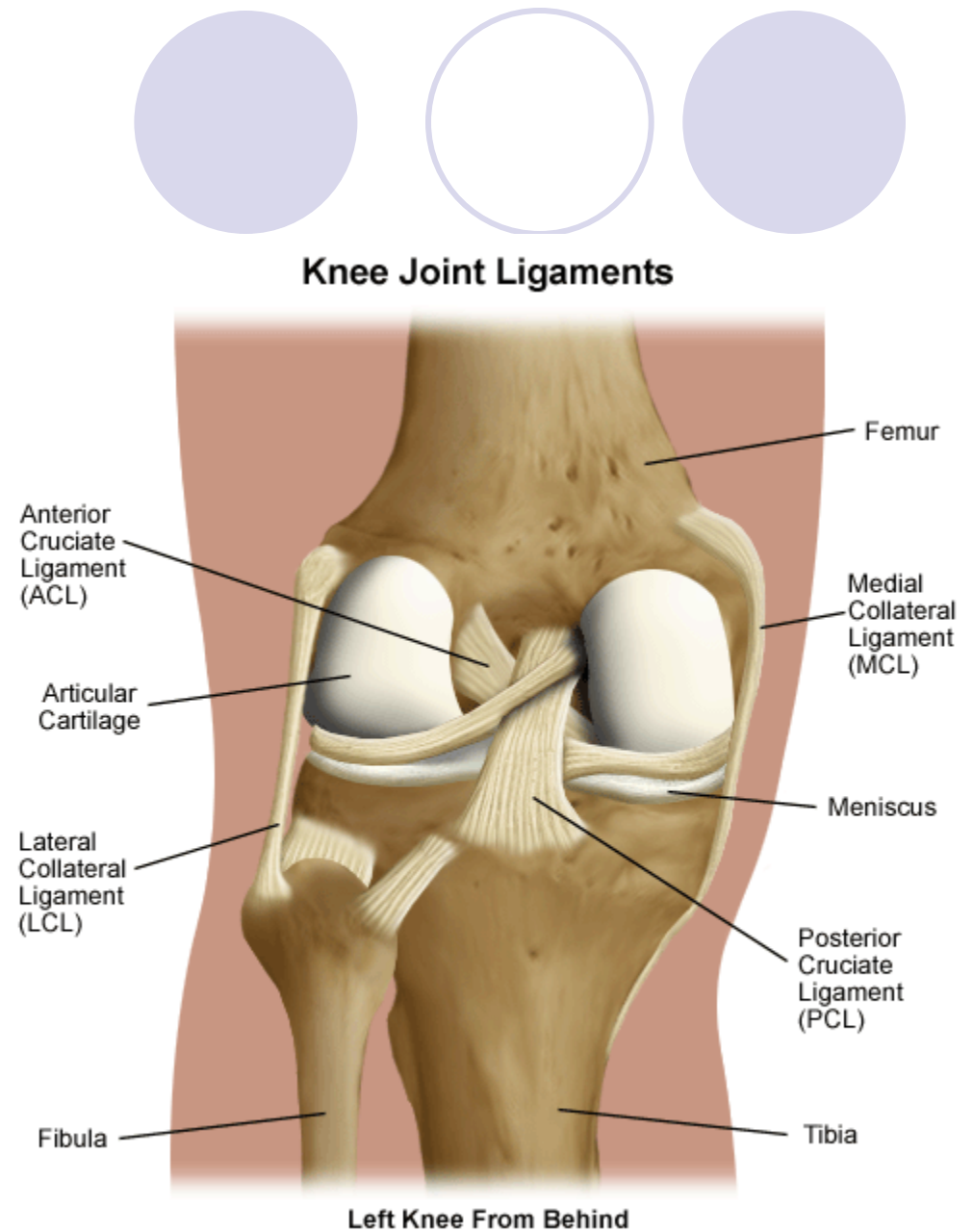


ANATOMY

- Ligaments

- Anterior cruciate
- Posterior cruciate
- Medial collateral
- Lateral collateral

- Meniscus



COMMON INJURIES

- Bone

- Fracture
- Arthritis

- Muscle

- Strain*
- Tear
- Tightness*
- Tendonitis*

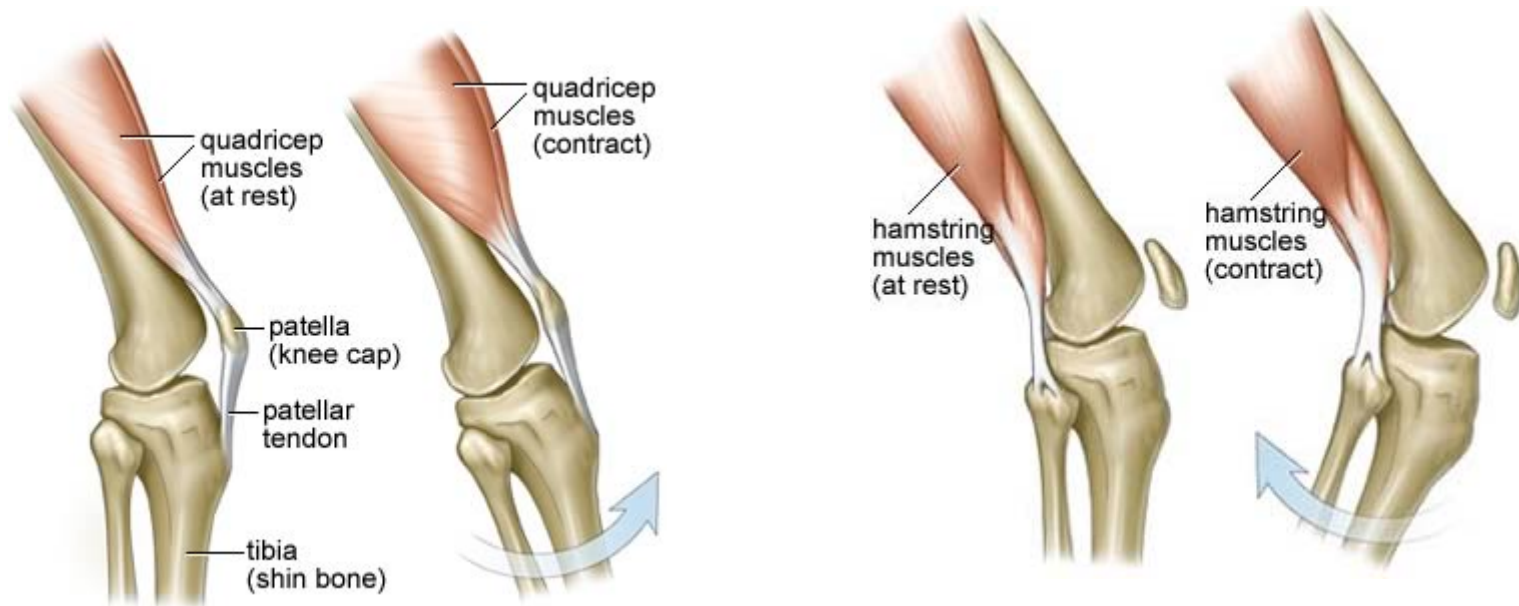
- Ligament

- Sprain*
- Tear

- * Denotes the main type of injuries that cyclists present with to the clinicians presenting.

BIOMECHANICS

- Internal and external forces which act upon the body



Common Knee Injuries Cyclists Present With.....

- Patellar Tendinitis
- Chondromalacia
- Iliotibial Band Syndrome
- Collateral Ligament Overstrain
- Popliteal Tendinitis or Overstrain

Patellar Tendinitis



- Inflammation of the patella tendon, usually due to overstrain
- Microscopic tears which heal over time producing microscopic scars
- Tearing and scars of this microscopic nature cause the tendon to enlarge producing friction thus resulting in pain
- Symptoms normally include pedalling or walking, especially down stairs
- Normally associated towards the lower end of the tendon
- Worrisome sound called Crepitus, which is due to decreased lubrication
- Often caused by hard sprinting, climbing in a bog gear or off-bike jumping activities
- Combination of activities on and off bike normally would cause this condition e.g. in triathlons.

Chondromalacia



- Softening or degeneration of cartilage behind the patella
- If left uncorrected it causes joint surface instability hence producing arthritic condition
- Pain experience behind patella would normally be its presenting complaint
- Often occurs with those who do hard climbing which includes up and down stairs or continually pushing big gears or even excessive weight training.
- Aching and stiffness is often experienced after prolonged sitting
- One of the main causes of patella instability that often leads to unequal wear of this joint



Iliotibial Band Syndrome

- Connective tissue from hipbone to the insertion below the knee on each lateral side of the legs
- Symptoms often sharp stabbing pain on the outside and middle of the knee
- Starts off with a twinge then progresses to a degree of pain often described as a stabbing sensation
- Normally worse during the power position of the pedal stroke
- Normal causes are poor bike fit – bike stance that is too narrow or badly positioned cleats, saddle that is too high.
- Biomechanical factors such as bow feet or flat feet can also cause this condition
- Excessive riding can also cause this condition



Collateral Ligament Overstrain

- Similar to ITB conditions, it generally affects the stabilising ligaments on either side of the knee
- These ligaments act as stoppers to maintain the integrity of the hinge joint which is the knee
- Often pain is presented on either side and can be directly associated with feet or hip instability due to poor posture or bike set up.
- Saddles positioned too high or too low can contribute to this condition

Popliteal Tendinitis or Overstrain



- Triangular muscle situated at the posterior aspect of the knee often described as the 'soft tissue' of the joint
- Subject to intense deep pain with discomfort experienced when sitting or over extending the walk.
- Normal cause is the saddle being too high or using a fixed /single gear bike
- Bow legged people suffer from this condition a lot
- Excessive float of the pedals worsens this condition.

TREATMENT METHODS - GENERAL

- Acute

- RICE
- Gentle cross friction muscle mobilisation
- Gentle ranging and stretching but not beyond stretch reflex.
- Soft tissue treatment involving muscle and joint mobilisation techniques to stabilize major muscle groups first before smaller /intrinsic muscles are worked on.

- Chronic

- Postural re-alignment. Check hip and feet biomechanics
- Dynamic stabilisation / treatment methods

Perth Integrated Health Clinic Methods Used

- Formostar Far Infra Red – Chronic Conditions
- Key Module Treatment – for acute / post operative care including muscles, ligaments and tendons
- Hands On Soft Tissue techniques – involving muscle mobilisation and adjustments to assist with muscle fibre realignment and feedback to nervous system
- Huber Dynamic Treatment Systems
- Vibration Science with WBV 3000
- Exercise Physiology
- Feet Biomechanics through Podiatry
- Therapeutic Massage



Commonly asked questions...

- 1. How do I care for my knees on rides?
 - A. Keep them warm
 - B. Warm up – 15 minutes
 - C. Spin – between 80 to 110 rpm on flats and no lower than 70 rpm when climbing on the saddle
 - Build distance gradually
 - Develop variations to the ride

Question # 2 – What if I have a pre-existing injury?

- Bike fit must of course be correct for the biomechanics of the person
- Review ride terrain / elevations
- Decrease sprints and keep cadence or momentum on the flat
- Consult a tertiary qualified health professional
- Remember there is a difference between a bike fit and bike ergonomics. Qualified health professionals who have direct clinical experience and coaching knowledge of cycling are best placed as providers of Bike Ergonomics

Key Module Techniques



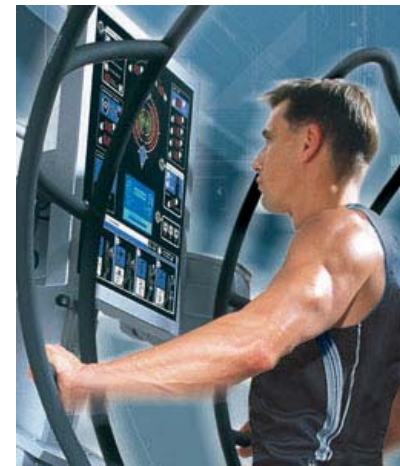
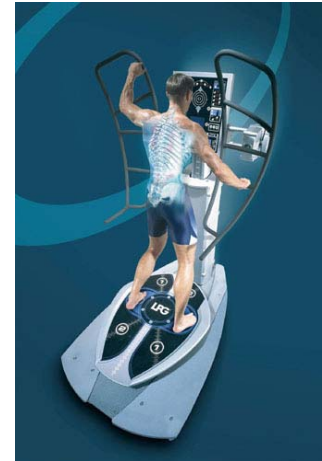
- Reverse Pressure Roller & Suction Pressure to prevent ischemic compression of soft tissue
- Pressure hence intensity is variable
- Recovery rate up to 70% faster than conventional hands on approach

WBV 3000 – Use of science of vibration



- Varying the intensity of the vibration (harmonic frequency) can assist with knee joint strengthening
- Use of various positions

Huber Dynamic Systems



Formostar Far Infra Red



- Use of core deep heat for recovery of ligaments, tendons and muscles
- Variable intensity setting
- Static positioning and the silicon wrap provides comfort and warmth to the patient

If you are interested....



- Speak to one of the PIHC practitioners who are able to assist in bike ergonomics and your biomechanics
- Use the PIHC-Cycling WA screening card for your complimentary knee assessment (valid to end of May 2009)
- Grab a brochure about the various techniques & technologies available
- Take one of our pilot program brochures on stretching
- If you are keen on our cycling training program – take the blue brochure that says “Cycling”
- Email Ian Wee at: ianwee@pihc.com.au His card is enclosed in the pack provided.
- Check our website: www.pihc.com.au for more information on cycling and our range of clinical applications and clinical technologies used to assist cyclists.