

Common problems in runners

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Dr Leon Creaney – Consultant in Sport & Exercise Medicine

- University of Sheffield 1995-2001
- Junior Doctor 2001-2006
- GP 2006
- SpR in London 2007-2009
 - Royal London Hospital
 - Olympic Medical Institute
 - DMRC Headley Court (Forces)
 - Royal National Orthopaedic Hospital
 - Pure Sports Medicine
 - English Institute of Sport
 - UK Athletics
- Post-CESR
 - Locum Consultant in Sheffield (2010)
 - MIAC clinics RRU Aldershot
 - Bupa Clinic (Barbican)
 - Substantive Consultant in Birmingham 2011

Currently:-

- Mon & Tue – University Hospital Birmingham (NHS)
- Wed – BUPA Sports Medicine (Barbican)
- Thu – Bupa management day
- Bridgewater Hospital & Spire Manchester



HIP & PELVIS

News Opinion Environment **Sport** Life & Style

Athletics Cricket Football Golf Water Rafting Olympics Rugby

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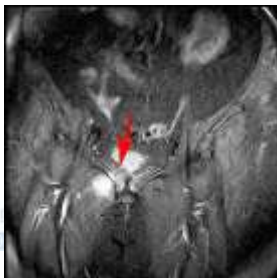
Athletics: Groin injury stops Farah de European title

By David Martin
Thursday, 22 November 2007

Mo Farah will not defend his European Cross Country title in Toro, Spain, next month as he continues his recovery from a groin injury. Farah, who was pre-selected to chase a second successive crown, has also withdrawn from the Great Britain and Northern Ireland team competing in the Chiba Ekiden Relays in Japan tomorrow.

The Somalia-born athlete, who finished second over 5,000 metres at last year's European Championships, will now focus on next year's Olympic Games. Farah decided not to defend his crown for fears of aggravating the injury and plans to spend January in South Africa – the first training camp of the year.

"My preparations for Beijing have to take priority," Farah said.



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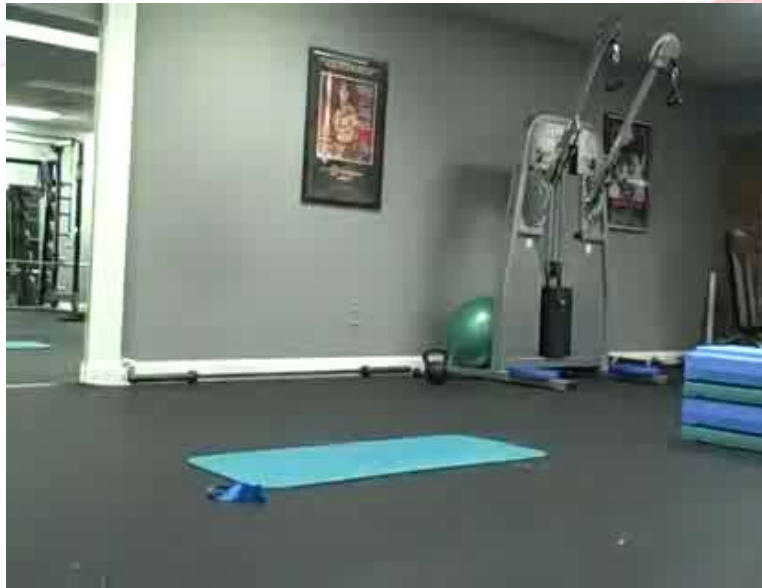
Toughest part of your sporting life: "A stress fracture of the pelvis, which was awful..."
Mo Farah - Telegraph

Gluteus Medius Tendinopathy

- Lateral hip pain
- Confused with Trochanteric Bursitis
- Temporary relief from steroid injection
- Clam shell exercise



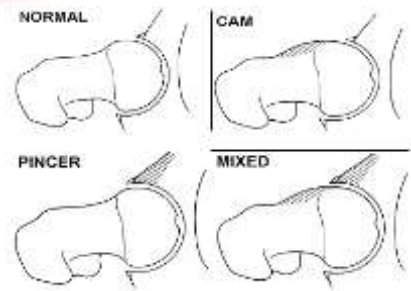
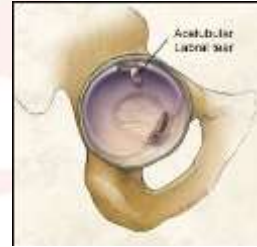
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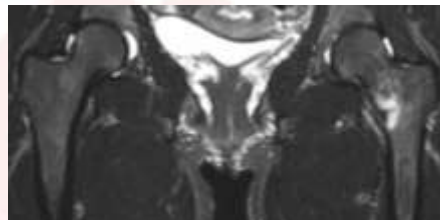
Hip Joint Pathology

- Labral tears
- Femoro-acetabular impingement
- Female, Straight line runner with groin pain, more likely to be hip related than groin.
- CJ Bradshaw, M Bundy, E Falvey "The diagnosis of longstanding groin pain: a prospective clinical cohort study" Br J Sports Med 2008; 42:551-554



Femoral Neck & Shaft Stress Fractures

- Thigh or Groin pain
- Insidious onset
- Gradual worsening over weeks
- Impact
- Worsens during exercise
- Will be missed on plain X-ray, needs MRI
- Complete non-weight bearing on crutches, up to 12 weeks.
- Occasionally DHS (superior side)



THIGH



Hamstring Tear

- Usually sprinters, or sprint finish
- Sudden posterior thigh pain
- Vague history, insidious onset, positive slump – subclinical radiculopathy
- Eccentric loading



KNEE

Ilio-tibial Band Syndrome (Lavine 2010)

Pain around lateral femoral condyle

Aetiology: Friction v Compression

During a run, crescendo pain until can't run through it, downhill running

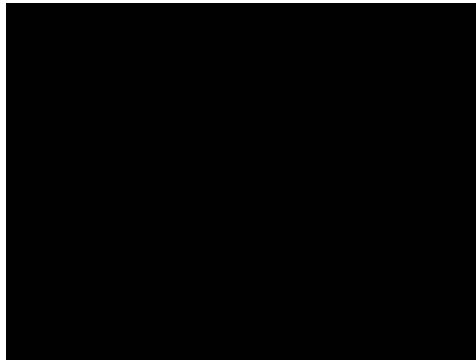
Due to tight ITB primarily? Others found opposite (Noehren 2007) – Ober's test poor

Weak external rotation

Weak abduction, Increased peak hip adduction and knee internal rotation (Noehren 2007)

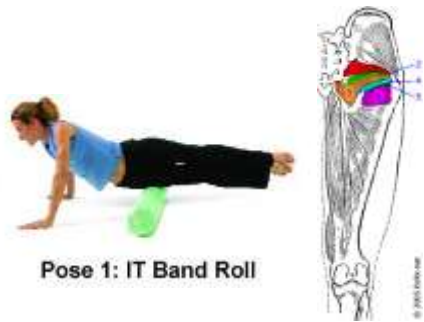
Poor core – pelvic stability and/or foot mechanics (pronation/eversion)





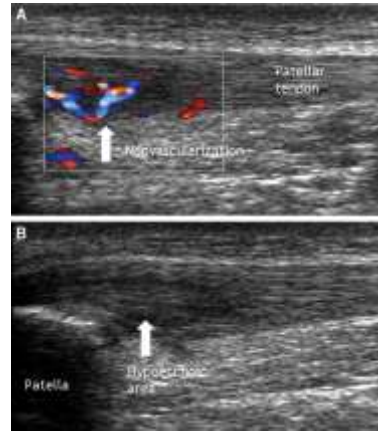
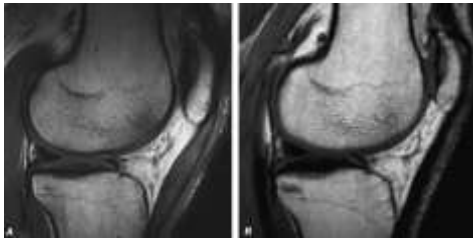
Management

- Video Gait analysis
- Ice – NSAIDS – relative rest
- ITB release
- ITB unloading Tape
- Pelvic – core stabilising exercises
- Hip external rotators
- Foot biomechanics
- Dry needling quads/ITB
- Responds well to injection
- Last resort – Z-plasty



Patella Tendinopathy

- Overload and faulty biomechanics leads to degeneration of tendon
- Usually proximal - adjacent to pole of patella



Eccentric loading
(Purdam *BJSM*
2004)

Improvement in
results
with 25° decline
board to increase
load on extensor
mechanism.

Patello-Femoral Pain

Pain mainly around front of the knee

Imbalance between medial and lateral quads

During or after run – can stay painful 2-3 days

Pain on steps, squatting, sit with bent knee

Often see loss in bulk of quads and timing issues (EMG – VMO/VL)

?Can lead to long term cartilage wear and OA (Chondromalacia patella)

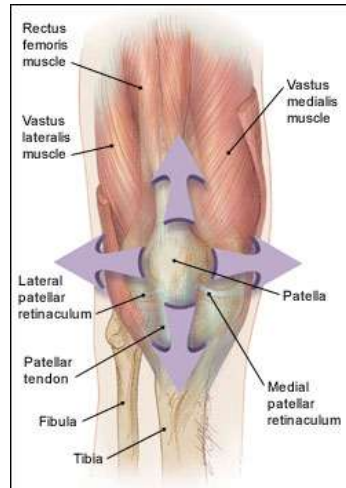


Illustration © 1999 Floyd E. Hosmer

TABLE 3. Physical therapy and placebo intervention protocols.

Physical therapy intervention protocol

- Patellar taping
 - Progressive functional retraining of VMO using dual channel, surface EMG biofeedback*
 - (i) Weeks 1–2: isometric VMO contractions in sitting with the knee at 90° flexion and inner range squats to 40° knee flexion combined with isometric gluteal contraction
 - (ii) Weeks 3–6: when the participant could complete five step downs from a 20cm step with out pain, the step down exercise and VMO retraining with a isometric hip abduction in standing were included
 - Gluteal strengthening exercises and stretching of soft tissue structures
- Placebo intervention protocols**
- Placebo taping (vertical taping)
 - Inoperative ultrasound[†]
 - Light application of a nontherapeutic gel (ultrasonic gel + hospital hand cream)

* Pathway MR-20, The Prometheus Group, Dover, DE.

[†] Custom-made devices, Metron Australia.

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- Preferential VMO activation? (Smith *Physiother Theory Pract* 2009)
- Psychology – “fear avoidance” (Piva *J Rehabil Med* 2009)
- Pelvic – core stabilising exercises
- Foot mechanics
- Reduce training load.

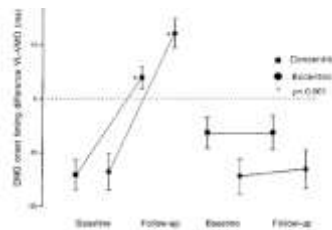
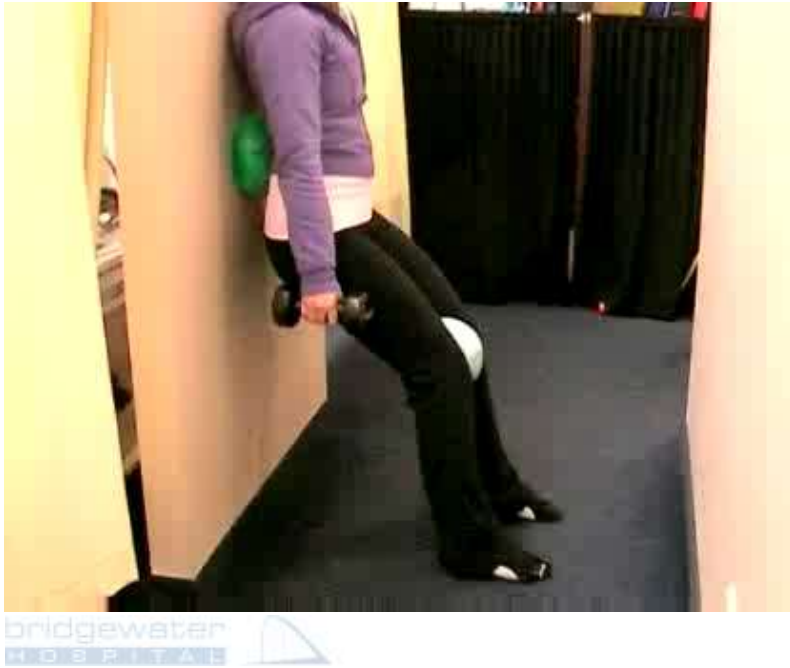
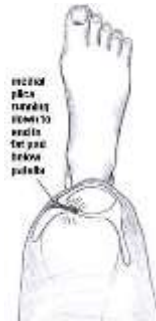


FIGURE 1—Means and standard errors for EMG onset timing difference at baseline and after the 6-week treatment program for the physical therapy and placebo groups. Although there was an difference in EMG onset between groups before treatment, only the physical therapy group had a significant improvement in VMO timing relative to VL after treatment.

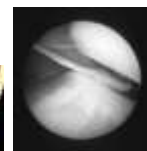
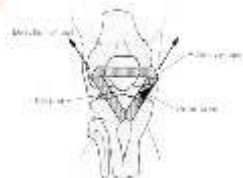


Anterior Knee Pain – other causes

Fat pad impingement



Medial Synovial Plica



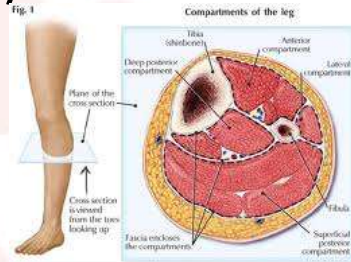
LEG



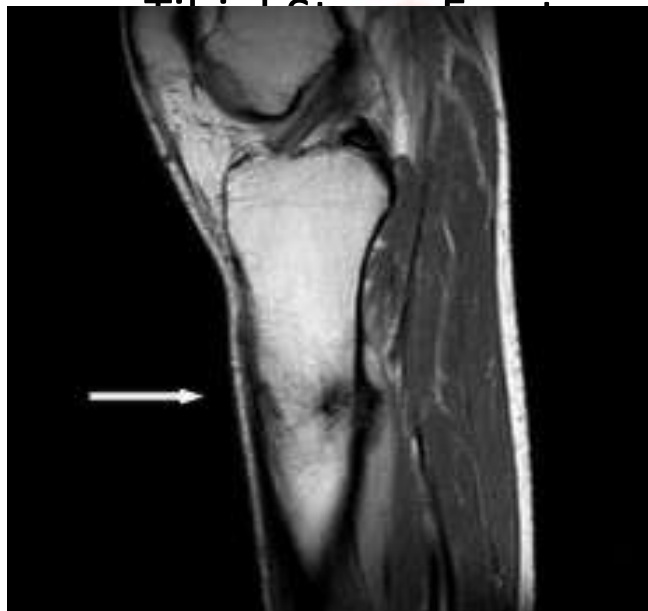
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Compartment Syndrome

- Usually Anterior
- Crescendo pain, eases with rest, returns on running
- Can lose pulses
- Pressures (Pedowitz *AJSM* 1990)
 - Resting > 15mmHg
 - 1-min post > 30
 - 5 min post > 20
- “Live” recording (DMRC)
- Exclude other vascular causes
- Massage, Soft-tissue therapy, biomechanics
- Fasciotomy



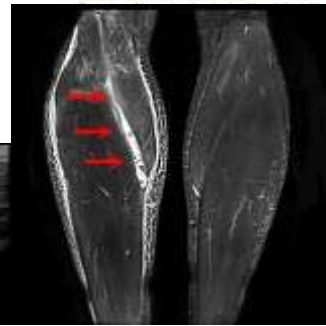
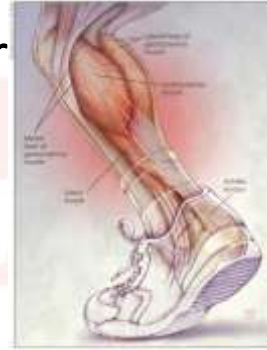
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Calf Strain / Tear

- Gastrocnemius or Soleus
- RICE
- Heel raise
- Early mobilisation & Stretching after 24°
- Concentric loading > Eccentric loading
- Cross-training
- Walk > Jog > Run > Sprint according to pain



ANKLE

Achilles Tendinopathy

- Degeneration of the achilles
- Faulty biomechanics likely to play a role
- Often presents at a time of increased training – intensity/distance/hills
- Morning pain and stiffness that improves with activity
- Tender to touch over the achilles
- Early disease: Athlete can often keep running as they warm up
- Advanced disease - unable



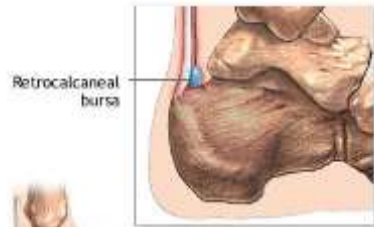
Management

- Relative rest and ice
- Shoe/orthotic correction
- Calf massage/stretching
- Eccentric training program
- (Alfredson *Knee Surg Sports Traumatol Arthrosc* 2003)
- Ankle mobilisation
- Heel lift
- Medical Intervention – high-volume injections, PRP, GTN patches, surgery.



Posterior Ankle Pain

- Achilles Tendinopathy – midportion or insertional
- Posterior Ankle Impingement Syndrome (PAIS)
- Retrocalcaneal Bursitis
- Both can respond to an Ultrasound-guided injection
- PAIS often needs surgical excision of Os Trigonum



#ADAM

FOOT

Plantar Fasciitis / Plantar Fasciosis

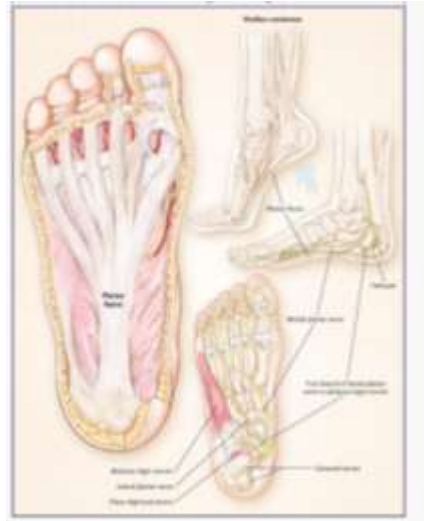
Sole of foot – in arch or heel (usually medial origin)

Often worse first thing am or after immobility
– first step of the day pain

Myxoid degeneration with fragmentation and degeneration of the plantar fascia, no true inflammation (Lemont *J Am Podiatr Med Assoc* 2003)

Can be related to pronated or 'flat feet' and increased vertical ground reaction force (Pohl *Clin J Sport Med* 2009)

Caution – Stress fracture of calcaneum or plantar fascia tear



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Management

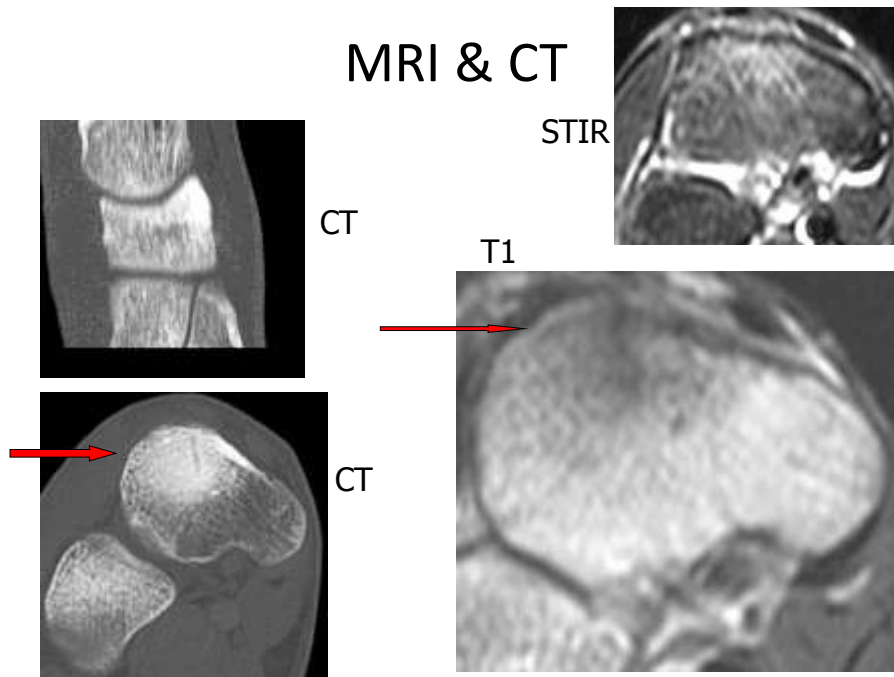
- Relative rest
- Massage and ice
- Calf / Foot stretches
- Foot intrinsic strengthening
- Night Splint
- Aircast Boot
- Orthotics v Barefoot?
- Extracorporeal Shockwave Therapy (Metzner *Foot Ankle Int* 2010)
- Cortisone Injections – danger of converting degeneration into rupture
- Platelet-Rich Plasma?? (Peerbooms *BMC Musculoskelet Disord* 2010)



Foot Pain

- Metatarsal, Navicular, Calcaneal, Sesamoid stress fractures
- Plantar Fasciosis / Tear
- Localised tenderness
- NWB or Aircast Boot
- 6-8 weeks





Stress Fractures

- Relative Rest followed by progressive loading
- Maintain other components of fitness by non-impact cross-training (HR/VO₂ > 90%)
- NWB → TWB/PWB → FWB
- Aircast Boot
- Screen for Osteopaenia - DEXA
- Bisphosphonates / Teriparatide (PTH) / Platelet-Rich Plasma?
- Vitamin D / Calcium / Energy – Fat & CHO

MEDICAL PROBLEMS

Tiredness / Fatigue

- What is a 'normal' weekly mileage?
 - 800m, 1,500m, 3000m – 70mpw
 - 5,000m-Half-Marathon, Cross-Country – 100mpw
 - Marathon – General Public 50mpw, Elite 120-140mpw
 - "Ultra" runners 150mpw (quality?)
- Unexplained underperformance syndrome (UUP), overtraining, overreaching, chronic fatigue, fibromyalgia
- Often associated with other issues – poor sleep, poor nutrition, poor recovery
- Generalised symptoms – myalgia, headaches
- Frequent injuries or viruses/illness
- Often no cause found, period of rest and gradual re-introduction of load
- Viral Serology – EBV.



Tiredness/Fatigue

- **Iron Status** (Deakin – Clinical Sports Nutrition)
 - Hb >13 Men, >12 Women
 - Iron essential in Haemoglobin, Myoglobin, Oxidative enzymes and respiratory chain proteins
 - Small decrease in Hb 1-2g/dL can reduce VO_2 20%
 - Keep Ferritin >30 μ g/L, preferably > 50.
 - Taniguchi *J Nurt Sci Vitaminol* 1991
- **Vitamin D** (Ceglia 2008, Hamilton 2009, Cannell 2009)
 - Sunlight exposure, low levels common in UK
 - Implicated in chronic widespread pain and myopathy
 - Steroid-like hormone
 - Associated with peaks in performance, levels > 50ng/mL
- **Magnesium** (Bohl 2002, Newhouse 2000, Cox 1991)
 - Weak evidence of effect on performance, if RBC Mg^{2+} low probably worth supplementation



Exercise-induced Asthma / Bronchoconstriction

- Cold and dry air at high ventilation produces an inflammatory reaction leading to a fall in maximal ventilation
- Detrimental to exercise performance, and post exercise symptoms – particularly in cold or dry environments
- Diagnosed using sensitive tests – Eucapnic Voluntary Hyperpnoea – fall in FEV1
- Management
 - Double Warm-Up
 - Salbutamol
 - Oral Steroids / Montelukast / Cromoglicic acid




Cardiology screening


- In > 35 most likely cause on Sudden Cardiac Death is ischaemic heart disease
- In < 35 many conditions:-
 - Hypertrophic Cardiomyopathy
 - ARVD, anomalous origin of the coronary arteries, Brugada syndrome, CPVT, LQTS, WPW
- Screening – exercise-induced symptoms, collapse, cardiac signs and symptoms, Family History, ECG
- Worries – referral to CRY Cardiologist – Professor Sanjay Sharma
- Advanced investigations – CPEX test, Echo, Cardiac MRI, Ajmaline

Normal and abnormal appearances in athletes' ECGs

Normal	Abnormal
<ul style="list-style-type: none"> • Sinus bradycardia (HR < 60) • First degree AV block (prolonged PR interval) • Incomplete RBBB • Early repolarization ('high-take off') • Isolated QRS voltage criteria for LVH 	<ul style="list-style-type: none"> • T-wave inversion (beyond V2*) • ST-depression • Pathological Q waves • Left atrial enlargement • Left axis deviation/left anterior hemiblock • Right axis deviation/left posterior hemiblock • Right ventricular hypertrophy • Ventricular pre-excitation (δ-wave) • LBBB or RBBB • Long or short QT • Brugada-like early repolarization ('coved')



Brugada 'coved' ST segment



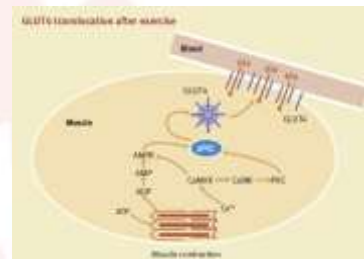
δ -wave

*T-wave inversion to V3 can be seen in under-16s and Afro-Caribbean patients.
HR, heart rate; LVE, left ventricular hypertrophy; LBBB, left bundle branch block; RBBB, right bundle branch block.



Diabetes

- Exercise forms an important part of the long term management of Diabetes
- Improved insulin sensitivity for 48hours post-exercise
- Exercise/muscle contractions releases GLUT4 glucose transporter via an insulin-independent mechanism
- Risk of hypoglycaemia post endurance exercise (first 90 mins most at risk, but up to 48hrs post)
- Likely reduction in insulin dose (~ 50%)
- Carbohydrate snacks
- High-intensity/Anaerobic exercise has the opposite effect - hyperglycaemia



Exercise in the Heat

- Risk of heat related illness greatest $>27^{\circ}$ or high-humidity
- Postural Hypotension/Dizziness is common post-marathon, not heat related and only treatment is lying down
- Heat Exhaustion $<40^{\circ}$
- Heat Stroke
 - Core (rectal) temp $>40^{\circ}$
 - Confusion / Collapse / Coma $>$ Death
 - Absence of sweating
 - Management – immediate cooling, CWI
- Hyponatraemia ($\text{Na}^+ < 135$) - confusion, overdrinking
- Guidelines – drink to thirst only (Elite Athletes 500mL-1L)



Thank you
Any Questions?

PDF available @

www.sportandexercisemedicine.co.uk

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The screenshot shows a web browser displaying the website www.sportandexercisemedicine.co.uk. The page has a light blue background and a navigation bar at the top with the following links: Home, For Patients, For Health Professionals (highlighted), For Commissioners, For Press, Health & Sport Blog, and Contact Us. Below the navigation bar, there is a banner for 'Sports Medicine' featuring a silhouette of a runner and a photograph of a man in a suit. A dropdown menu is open under 'For Health Professionals', listing the following items: SEM Evidence vault, Exams, Jobs in Sports Medicine, SEM News, Sports Medicine Journals & RSS feeds, Elite Sports Medicine, Teaching resources (highlighted), Publications and Presentations, Courses & Conferences, and Links. Below the banner, the 'Presentations' section is visible, containing the text: 'Below are .PDF's of Powerpoint presentations/teaching I have done over the years. If you wish to have any of the Powerpoints to use in teaching, please ask and I will send you the full file.' and 'For Health Professionals (GP's, Physiotherapists or Sports Physicians)'. Two links are provided: [Evidence on Autologous Blood Injections](#) and [Exercise in Inflammatory Arthritis](#).

www.sportandexercisemedicine.co.uk

